

Considering the Use of Data by School Leaders for Decision Making: An Introduction¹

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Our fifth book in the *International Research on School Leadership* series focuses on the use of data in schools and districts as useful information for leadership and decision making. Schools are awash in data and information, from test scores, to grades, to discipline reports, and attendance as just a short list of student information sources (Bernhardt, 2004), while additional streams of data feed into schools and districts from teachers and parents as well as local, regional and national policy levels (Henig, 2012; Honig & Venkateswaran, 2012; Piety, 2013). To deal with the data, schools have implemented a variety of data practices, from data rooms, to data days, data walks, and data protocols (Mandinach & Gummer, 2013; Marsh, 2012). However, despite the flood of data, successful school leaders are leveraging an analysis of their school's data as a means to bring about continuous improvement in an effort to improve instruction for all students (Boudett & Steele, 2007). Nevertheless, some drown, some swim, while others find success. Our goal in this book volume was to bring together a set of chapters by authors who examine successful data use as it relates to leadership and school improvement. In particular, the chapters in this volume consider important issues in this domain, including:

- How do educational leaders use data to inform their practice?
- What types of data and data analysis are most useful to successful school leaders?
- To what extent are data driven and data informed practices helping school leaders positively change instructional practice?

- In what ways does good data collection and analysis feed into successful continuous improvement and holistic systems thinking?
- How have school leadership practices changed as more data and data analysis techniques have become available?
- What are the major obstacles facing school leaders when using data for decision making and how do they overcome them?

The chapters throughout this volume acknowledge the point that much of current policy and research in PK-12 educational leadership and administration argues for the use of data in school decision making and leadership yet provides little in the way of research-based best practices (Coburn & Turner, 2012; Dunn, Airola, Lo, & Garrison, 2013). Indeed, Coburn and Turner (2012) note that to date there have been three streams of research in school data use: 1) a small amount of research on data use and outcomes; 2) data use initiatives that put the technology and systems in place; and 3) research espousing the possibilities of data use with little to no analysis of the possibilities in action. This push to use data in practice comes in part from the success of the last decade globally as data systems have been put in place to capture the multiple forms of data generated on students in schools (Bowers, 2009; Piety, 2013), and provide that information as a means to inform students, teachers, administrators, parents, and communities as to the success of their schools (Wayman, Jimerson, & Cho, 2012; Wayman & Stringfield, 2006). For school leaders, this has led to an avalanche of data, creating situations where leaders have trouble processing the amount of information generated in schools, and find it difficult to know where to start in identifying areas for improvement (Murray, 2013; Reeves & Burt, 2006). The existence of data alone does not itself create positive change.

Some researchers have argued that to have school leaders use data in their practice, they must first be trained in statistics to understand the data analytic possibilities available to them within the large datasets generated in today's schools (Thornton & Perreault, 2002). Indeed, many school leadership preparation programs include a course on research methods and statistics, but little in the way of training in how to engage practitioners around data (Hess & Kelly, 2005; Militello, Gajda, & Bowers, 2009) or in issues

¹ This document is a preprint of a manuscript in Volume 5 of the Information Age Publishing book series on *International Research on School Leadership*. Citation: Bowers, A.J., Shoho, A.R., Barnett, B.G (2014) Considering Use of Data by School Leaders for Decision Making – An Introduction. In A.J. Bowers, A.R. Shoho, B. G. Barnett (Eds.) *Using Data in Schools to Inform Leadership and Decision Making* (p.1-16). Charlotte, NC: Information Age Publishing Inc.

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about data literacy (Mandinach & Gummer, 2013) which is doubly problematic given the complete lack of this type of training for teacher certification (Shavelson, 2006). In some ways, arguing for statistical knowledge first for school data use is putting the metaphorical cart before the horse, or, to update the metaphor, putting the statistics before the data and an evidence-based school culture. Most statistics training holds inferential statistics in high regard, yet school leaders do not wish to infer to the larger population outside their school. Rather, their focus is on their students at hand examining the detailed information around each student and teacher's progress (Bowers, 2010) in which they create meaning together with the teachers around the data that are seen as useful for their context and student issues (Coburn & Talbert, 2006; Coburn & Turner, 2011a). Teachers report that they are rarely given time to examine student data together in a participatory environment (Little, Gearhart, Curry, & Kafka, 2003), yet research has long shown that teachers engaging in questions about instruction, pedagogy and student learning with their own student's work helps create useful and productive professional development opportunities from the conversations around data that are embedded within teacher daily practice (Coburn & Turner, 2011b; Cohen & Hill, 2001; Dunn, et al., 2013; Piety, 2013).

Given the ever increasing amount of data available to teachers and leaders, and increasing calls for additional collection of multiple forms of data (Coburn & Turner, 2012), there appears to be a perception in the policy rhetoric that if schools were to just collect "the right" data then it would become obvious to teachers what they should do with which students. But it is not that simple. More data does not cause improvement, just as driving more miles to work does not cause a commute to improve. This analogy is especially apropos since "improve" for a commute to work could be defined in multiple ways (as with a definition of "improve" for schools), and so for the commute analogy, improvement could be defined by different people as quicker, shorter, more scenic, quieter, with an important stop such as daycare on the way, etc. Driving more miles may "improve" the commute, or it may not. The point is not the total amount, but how it is used, and so it goes for data in schools. Hence, rather than focus on school leaders analyzing ever more data, which today turns into large binders of bar charts presented at the start of the school year and then forgotten (Wayman, Cho, Jimerson, & Spikes, 2012), the recommendation is for school leaders to focus on creating a climate of collaborative trust and a focus on the evidence used to support instructional decisions and inferences (Boudett, City, & Murnane, 2013).

With a seemingly overwhelming amount of data and lacking the capacity and statistical training to analyze the data at the teacher and leader levels, the emerging theme in the literature (Hamilton et al., 2009), and across many of the

chapters in this volume, is the argument to build evidence use capacity in schools, which differs from data analytic capacity. Now that the data systems exist to provide evidence in schools (Piety, 2013), working to build the capacity of a school's faculty around asking questions about evidence is a necessary pre-condition before moving into data analytics. Adhering closely to the ladder of inference (Argyris, 1983), recent literature on organizational improvement in schools around data and evidence use encourages leaders and teachers to create a culture in which teachers feel safe to ask each other, and the leader, the question "what is your evidence of that?" when met with assertions about student, teacher and school performance, rather than depend upon intuition and high level inference (Bambrick-Santoyo, 2010; Boudett, et al., 2013). This is a shift from summative data use to formative data use through systems and routines to create feedback loops around the evidence that matters to teachers in their classrooms and across their school (Halverson, 2010). In one sense this is an argument for the conversations in schools to shift from low evidence/high inference to high evidence/low inference.

As noted in the recent literature on data analytics and the emerging domain of data sciences, analyzing data in organizations is a uniquely human endeavor, as it is the job of the data analyst to find the story in the data and engage stakeholders in conversations about what it means in their daily practice (Schutt & O'Neil, 2013). Additionally, we know that bringing school faculty together around data that includes information about their students and their student work, especially around interim or "medium term" assessments (Supovitz, 2012), can help create the types of conversations, routines and structures that lead to professional development, capacity around data use, and the potential for informed and informative feedback systems (Halverson, 2010; Hamilton, et al., 2009; Spillane, Parise, & Sherer, 2011). These conversations not only increase standardized test scores, but also teacher professional practice, student engagement, academic climate and a focus on learning and instruction rather than on implementation and adoption (Bowers, 2008; Bryk, Gomez, & Grunow, 2011; Thompson, Sykes, & Skrla, 2008) .

Nevertheless, building capacity for making data driven decisions is necessary but insufficient for instructional improvement (Wohlstetter, Datnow, & Park, 2008). School administrators must be instructional leaders who engage faculty in collaborative dialogue and professional development (Urlick & Bowers, 2014), but also work to find and set the vision and mission of the school, create a climate for learning for students and adults in the school, and structure the schedule to provide time for teachers to reflect on their practice and the evidence of student learning (Boyce & Bowers, in preparation; Murphy, Elliott, Goldring, & Porter, 2007). As noted in this volume by Bickmore in chapter 2, current conceptions of instructional

leadership, when viewed through the frame of data use for school improvement, lead to a leader's focus through data and evidence on defining the school mission, managing the instructional program and creating a positive school climate by building "individual teacher data literacy skills and teacher and curricular instructional capacity". However, as noted by Brocato, Willis & Dechert in chapter 5 of this volume, which forms of data and what data are important for the daily practice of schools differs across teachers, principals and superintendents. Thus, leaders must synthesize and prioritize information gained from data analysis (Mandinach, Honey, & Light, 2006), and work to build the story to be told from the data with the teachers as the instructional vision and mission of the school - a central component of current theories of integrated leadership (Marks & Printy, 2003; Printy, Marks, & Bowers, 2009; Urick & Bowers, 2014).

In this volume, the authors take on these issues across the manuscripts, addressing these questions from the current research literature and evidence from practice in schools and districts from around the world. As editors, we were delighted to receive such excellent chapters that address many of these issues from multiple research, structural, and cultural lenses as they apply to the practice of school leaders using data in their organizations. The book is organized into four main sections. In section 1 (chapters 2, 3 and 4), the authors examine leadership data use practices as they are enacted in schools. Bickmore focuses on charter principal data use, as Farley-Ripple & Buttram examine the use of interim data practices. Cosner examines the implementation of data use practices and the complexities of the process across multiple years in schools. In section 2 (chapters 5, 6, and 7) the authors examine the types of evidence that school personnel view as useful to their practice. Brocato, Willis and Dechert ask the question of how the perception of what stakeholders need from longitudinal state data systems differ between superintendents, principals and teachers. Demski examines growing trends in Germany around evidence-based practice in schools, while Stosich provides a new instrument to assess school internal coherence around capacity building and data use. Section 3 (chapters 8, 9 and 10) examine data use policies in schools. Arar examines the impact of the New Horizons policy in Israel with Arab school leaders, while Koran and Carlson consider the growing trend of growth models as evidence for policy decisions in school improvement. Farley-Ripple and Cho then focus on the school district level and how evidence use is considered in central offices. The book volume then concludes with a synthesis of the chapters, a conclusion and a look at future trends by Halverson, focusing on what the research says (and doesn't say) about how these emerging trends may influence practice, and highlighting three "levels" of data use in schools for future attention and research.

Section 1: Leadership Data Practices in Schools

In Chapter 2, *Charter Principal Autonomy: A Missed Connection between Data-Driven Decision-Making and Instructional Leadership*, Dana Bickmore considers the topic of data driven decision making as it applies to charter school principal leadership through the lens of instructional leadership theory. One of the arguments of the chapter is to consider data and evidence based practices as a key component of instructional leadership. Bickmore argues that as principals define the mission of a school, manage the instructional program and create a positive school climate, that infusing data and evidence within these facets of instructional leadership is central to school improvement. However, Bickmore also shows that the context of the school matters as to how leaders may interpret the use of data in leadership. In her sample, for schools that are considered "failing", principal interpretations of data driven decision making focused on increasing test scores, rather than on improving the culture, dialogue and capacity around data literacy within the school. Bickmore concludes that a focus on data use without evidence and capacity building efforts may not lead to the intended improvements envisioned by the school leaders.

In Chapter 3, *Schools' Use of Interim Data: Practices in Classrooms, Teams, and Schools*, Elizabeth Nash Farley-Ripple and Joan L. Buttram explore the use of interim data for school improvement from multiple levels. In particular, this chapter examines how teachers and schools use interim data as well as what practices are impacted the most. Using mixed methods to collect data at four elementary schools over one academic year, Farley-Ripple and Buttram found that the most common and frequent use of interim data is to diagnosis student learning needs, prepare for parent conferences, and share among teachers. At the school level, interim data was used more to evaluate student learning. This was particularly true at the Professional Learning Community (PLC) level. Unfortunately, interim data was not used much by PLCs to impact curriculum and instruction decisions or to determine whether students were learning a particular lesson. These findings highlight how multiple levels view and use interim data in very different ways. This suggests that school systems need to set up a system-wide protocol to examine data use. Otherwise, the loose coupling phenomenon articulated by Weick will adversely impact the communication and use of interim data across multiple levels (Weick, 1976).

Like many studies, this study illustrates the contextual nature of interim data use and how using interim data to assess student learning, diagnosing student needs, influencing curriculum and instruction decisions, and setting appropriate goals can improve the quality of teaching and learning. The findings also demonstrated how diverse the use of interim data is at each level. As noted by the authors,

the “...results support findings from previous research which demonstrate the role of supportive school cultures, allocation of time and instructional resources, teacher collaboration, and leadership more generally in generating productive use of data” (p. 61 this volume).

Finally, the authors make an excellent point noting how important it is for teachers and leaders to be well-versed in understanding assessment systems and how interim data can be used to inform and improve teaching and learning. Unfortunately, despite thirteen years of NCLB and its implications to examine student data more closely, the quality for analyzing data is still in its infancy and needs to be improved uniformly if the fruits and promises of big and little data are to be realized.

Chapter 4, *Strengthening Collaborative Practices in Schools: The Need to Cultivate Development Perspectives and Diagnostic Approaches*, by Shelby Cosner, reveals how school leaders can influence the collaborative data decision making practices of grade-level teams. Cosner describes a three-phase conceptual model of how school leaders cultivate collaborative data decision making practices over time: (1) laying the groundwork for team collaboration, (2) implementing these data practices, and (3) providing support to strengthen their capabilities. To illustrate how leaders enact the third phase (strengthening collaborative data practices) she conducted a three-year longitudinal research study to examine schools leaders’ practices in three Chicago elementary schools. Data collection consisted of videos of professional development sessions, work products of teacher teams, leaders’ written accounts of how they were attempting to influence collaboration, and their assessments of team development.

The findings indicated school leaders focus on a variety of issues when attempting to improve the collaborative decision making processes of teacher teams. For instance, principals understood the importance of managing the boundary between team responsibilities and district policies and expectations. In some cases, this meant buffering teachers from external district demands; in other instances, they utilized district resources to facilitate team decision making. In addition, principals closely monitored teams and their impact by clarifying expectations for communicating their work with others in the school and observing classroom practices to hold teachers accountable for following through on their collaborative decisions. Cosner, however, also discovered that rather than using information gathered from their interactions with teams to diagnose and intervene to improve team dynamics, school leaders attended meetings and assisted in facilitating their discussions.

Besides reporting school leaders’ supportive actions, the chapter also describes the types of professional learning

experiences leaders can participate in to develop their knowledge and skills associated with team settings and teacher learning outcomes. Heightening leaders’ understanding of team settings occurred by having leaders examine meeting agendas, allocation of time, productive and unproductive team interactions, and facilitation strategies that affect team effectiveness. To discern teacher learning, principals viewed videos of teacher teams describing student learning and instructional efficacy. Often, we assume school leaders know how to nurture a collaborative decision making culture; however, this study provides empirical evidence of the benefits they receive from engaging in professional development.

Section 2: Sources of Evidence Use in Schools for Teachers, Principals and Superintendents

In Chapter 5, *Longitudinal Data Use: Ideas for District, Building and Classroom Leaders*, Kay Brocato, Chris Willis and Kristen Dechert examine the interesting issue of how school personnel at different levels of the system perceive their main needs from a state-level longitudinal data system. The researchers asked teachers, principals and superintendents about what data they would find useful from a longitudinal data system to examine the differences in perceptions of data usefulness vertically across the system. They found many interesting patterns in the data with some alignment in perceived data needs but also quite a bit of incongruence. In particular, while superintendents noted a need for comparative data to other districts and between schools, as well as budget and student services data, and principals reported needing data to examine how their schools compare to other schools, as well as wishing to be able to compare teachers on issues of discipline and attendance, teachers reported wanting to be able to examine the longitudinal data histories of their students so that they can stay informed of instructional decisions. This was especially relevant for examining higher and lower grade levels from the teacher’s current grade level to work to tailor instruction to student needs based on past performance and future needs, for both the student and the teacher. In particular, teachers wished to know about overall student outcomes, such as graduation and college-going, revealing a deep commitment by the teachers in the sample to their student’s life-course successes and a wish to be able to help and positively contribute. This look vertically across the data needs of schools and districts by Brocato, Willis and Dechert helps to further explicate the differing views of school agents at each level.

In Chapter 6, *Which Data Do Principals and Teachers Use to Inform Their Practice? Evidence from Germany with a Focus on the Influence of School Culture*, Denise Demski examines the particular types of data teachers and administrators in Germany utilize to inform their decisions as well as how school culture affects their use of evidence-

based decision making. Using a mixed-methods design, the study solicited questionnaire responses regarding evidence-based practices from a large sample of teachers and school leaders. Based on these responses, interviews with teachers and administrators in seven schools with different levels of evidence-based practices uncovered more detail about the school culture and levels of teacher and principal collaboration.

Questionnaire data revealed clear preferences for the types of data used for decision making. The most widely available data sources were inspection reports, school- or state-level comparative tests, and student feedback; however, student assignments and test items, surveys, and magazine or newspaper accounts of education were not widely used. Demski concludes that internally-developed evidence is far more conducive to school improvement decision making than externally-developed evidence. A pattern of data use and school culture also emerged. Schools using higher degrees of evidence-based information tended to have school cultures characterized by cooperation, flexibility, and innovation. In contrast, schools with competitive, results-driven, and stable cultures were less likely to use evidence-based information. These results complement Cosner's findings on collaborative data use (Chapter 4), suggesting that principals are instrumental in fostering a culture for teacher collaboration, especially in using data to make decisions for school improvement.

In Chapter 7, *Measuring School Capacity for Continuous Improvement*, Elizabeth Leisy Stosich details the validation of the Internal Coherence (IC) survey. The Internal Coherence survey is a survey instrument designed for school personnel to examine the school and organization processes around collaboration, leadership for learning, and teacher beliefs around their impact on instructional improvement and student learning. The instrument approaches these issues through examining "practices, processes and beliefs" that help school leaders understand how teachers may be considering data and school improvement efforts in their daily practice. Through the chapter, Stosich demonstrates the utility of the IC survey, providing strong evidence that the survey is a valid and reliable measure of leadership practices for instructional improvement, organizational processes and efficacy beliefs. Looking forward, the chapter lays the foundation for schools, districts and researchers to use the IC survey to help delineate the processes and practices around the skills needed for evidence-based instructional improvement and leadership.

Section 3: The Impact of Evidence Use Policies in Schools and Districts

Chapter 8, *Principals' and Teachers' Perceptions of Teacher Evaluation and Their Implications in Arab Schools*

in Israel by Khalid Arar, provides another international perspective on data use, particularly how teacher evaluation information can be used for improvement. Similar to Demski's focus on the relationship between school culture and use of evidence (Chapter 6), Arar explores how Arab cultural norms can impact principals' supervisory practices. To set the background for the study, he describes the New Horizons Reform in Israel, an initiative aimed at decentralizing the educational system. One of the major elements of this reform is the implementation of a new teacher evaluation model where principals are required to observe teachers' classroom practices; examine their portfolios; and assess whether teachers are performing at the basic, skilled, or excellent level. To better understand the reactions of teachers and principals to this new evaluation system, Arar conducted in-depth interviews with these educators in 14 Arab state elementary and junior high schools.

On one hand, results indicated that teachers and administrators view teacher evaluation in a positive light, especially as a means for improving overall school effectiveness. Benefits of this process included reducing teachers' isolation, increasing teacher accountability, fostering collaboration between teachers, and providing teacher-specific professional development. On the other hand, respondents expressed concern about the new teacher evaluation system. In some instances, principals were reluctant to conduct the required number of observations, relied exclusively on student achievement data in making their judgments, used evaluation results as a punitive measure rather than for development, and wrestled with how to weigh teachers' personal struggles with students' academic and social welfare. A major contribution of this study is how Arab cultural norms, which emphasize social hierarchies and control, affected how principals instituted this accountability-driven teacher evaluation system. For example, because Arab societies tend not to accept females in leadership roles, women principals evaluating male teachers were placed in a difficult position, especially if they wanted these teachers to improve. Furthermore, large powerful families (hamullas) in the community overruled principals' decisions about teachers' performance reviews and/or dismissal. In many instances, principals had to reconcile how to work with underperforming teachers taking into consideration powerful social and community norms. The chapter concludes by cautioning educational reformers in different cultural contexts about the dangers of embracing Western cultural policies and practices.

In Chapter 9, *Making Progress with Growth Models in Education: Utility for School Improvement* by Jennifer Koran and Cameron Carlson examines the utility of growth models for informing leadership and decision-making for continuous school improvement. Growth models have gained popularity for the past five years. This may be due to

the realization by states and school districts that most schools are not going to make AYP or meet NCLB's goal of having 100% of students proficient in reading, writing, and math by the end 2014.

This chapter provides an excellent start to understanding the conceptual underpinnings of growth models and the various methodologies associated with them. The authors address two classes of growth models. The first class of growth models can be modified for successful use within current school system structures. The second class of growth models is articulated in depth and distinguishes between modeling for growth and modeling for progress. The difference is primarily in expectations. The authors argue that modeling for progress is more in line with what teachers and administrators need for continuous improvement for their students and schools. As Koran and Carlson note, "It is important that the methodology for growth modeling match the expectations underlying the question to be answered using student performance data. If what is truly expected is a model that tracks students' progress through a curriculum (in which concepts are taught in a particular order) – and this certainly sounds like educational accountability to us – then alignment of the composite scale with the curriculum order is a key factor in the validity of interpretations based on the statistical model" (p. 216 this volume).

As noted by Koran and Carlson, one of the challenges with current growth models is the "dull" instrumentation to measure only "coarse" level information for administrators. This is hardly useful for teachers who are trying to assess whether their students are making progress through the curriculum. As such, the primary contribution of this chapter is to bridge the current gap in growth models to better measure student progress through the curriculum rather than of the curriculum.

In Chapter 10, *Depth of Use: How District Decision-Makers Did and Did Not Engage with Evidence*, Elizabeth Nash Farley-Ripple and Vincent Cho used a yearlong case study of one school district and three of its initiatives to understand how district level leaders engage or disengage with evidence available to them. Data was collected primarily through eighteen interviews with fourteen district level leaders and thirty-six observations at school board meetings, department of curriculum meetings, as well as professional development, and school improvement committee meetings. The case information from this chapter will resonate with many district level leaders.

The first initiative examined was the overhauling of professional development in the district. Through several layers of evidence, it was determined that professional development was not meeting the needs of teachers or supporting instruction in the ways it should be. The

evidence used to make this determination was vague at best. The typical response was "The research says..." yet there was little documentation of the research or any source of evidence to verify the claims. Instead of relying on empirical evidence, the evidence used to make decisions was based more on working knowledge and common sense. As an example, the authors cite how in the end, the decision to change professional development was influenced by what other neighboring school districts were doing and not on evidence collected within the district.

The second initiative involved the adoption of a high school new language arts textbook. Unlike the previous initiative where one person made the decision, the textbook adoption used a committee comprised of primary stakeholders who were the end users. The evidence used by the committee members relied mainly on what the textbook publishers provided and this rarely was research based. The committee used an evaluation form to evaluate forty-three dimensions of each of the four textbooks proposed. However, as Farley-Ripple and Cho noted, the validity of the evaluation form was questionable at best and in the end, practical knowledge displayed by committee members made a bigger impact on the decision than the results from the evaluation form.

The third and final initiative focused on the school improvement planning process. Up until this initiative, the school improvement planning documents produced were lengthy and not very useful to its end users. As a result, a school improvement planning committee was set up to streamline the process and produce plans that were user-friendly. As Farley-Ripple and Cho quoted one of the committee members, "Historically, we as building principals were free to say what our needs were in the building. Now we were expected to use data such as [state assessment] data to help determine what the instructional needs were." The expectation that data would determine instructional needs exemplifies how data figured prominently in re-vamping the school improvement plans.

What these three initiatives illustrate are the depth at which district level leaders use data and evidence. In some cases, the depth is deep and in other cases, it is very shallow. It also illustrates the power of working knowledge and its influence in contrast to evidence from sources outside their experiential base. Further exploration into understanding the nature and power of working knowledge seems ripe for further study.

Section 4: Conclusion and Future Trends

In the final concluding chapter, Chapter 11, *Data-Driven Leadership for Learning in the Age of Accountability*, Richard Halverson provides an overview and capstone chapter for this volume. Through a synthesis of the preceding chapters, Halverson articulates a theory of data

use in schools as a matter of three levels of accountability. In the first, data systems that are managed and led by educational leaders are tasked with reporting up the administrative and policy chain, to states and higher level bureaucracies for accountability purposes. However, the second level are the teachers and their embedded learning communities within schools that have begun to generate their own data, through interim assessments and savvy data practices that bring an evidence based continuous improvement philosophy to the daily practice of teachers and leaders. As Halverson details, to date there has been little synergy between the two systems, and while at times these levels have interacted, more often each ignores the other. To flesh out this theory, Halverson starts the chapter with a brief yet thought-provoking history of accountability in schools, and then moves the discussion to the rise of data-driven practices, accountability and school leadership through a review and synthesis of the concepts and findings from the chapters from throughout this volume. Halverson outlines the main thesis of this volume in the following:

A central lesson of this work is that leaders must attend to a two-level approach to using data in schools – one level to generate accurate feedback that connects instructional practices to system outcomes, and one level that meets the data needs of local practices of teaching, learning and school improvement. Creating a coherent data-driven instructional context means building links between these two levels so that systems outcomes data can accurately highlight opportunities for improvement and local data practices can generate real measures of progress in attaining improvement goals. (p.262 this volume)

Halverson concludes the book by highlighting a third level within this framework, in creating structures of school leadership and data use designed to support “learner-level” student and teacher learning, rather than just collect data on what was taught. This level of data integration promises a future in which students and teachers are better able to direct the learning in schools toward their own interests and unique voices through the use of modern technology. This is a topic rarely encountered in the current literature on school leadership and data use, but one that is surely to grow in popularity and attention in the coming years.

In conclusion, in an era of increasing attention on data use practices by teachers and leaders and an increasing focus on continuous improvement in schools, we believe that the chapters in this volume provide a significant and unique contribution to the literature in this domain. As school data systems continue to evolve, we encourage practitioners, researchers and policymakers to consider the multiple perspectives presented in this volume, and to take into consideration the findings presented throughout, especially in the consideration of the types of data that constituents at

each level of the system value and wish to work with, as well as the cautionary descriptions of school leaders working to weave data use into their daily practice. We are confident that as the field moves forward, the consideration of the types of issues presented in this volume around using data in schools to inform leadership and decision making will help to inform improvement efforts for students, teachers, schools and their communities.

Recommended Citation Format:

Bowers, A. J., Shoho, A. R., & Barnett, B. G. (2014). Considering the Use of Data by School Leaders for Decision Making. In A. J. Bowers, A. R. Shoho & B. G. Barnett (Eds.), *Using Data in Schools to Inform Leadership and Decision Making* (pp. 1-16). Charlotte, NC: Information Age Publishing.

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