What are We Talking About? Data Use Among Education Leaders of Change

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Matthew Townsley
University of Northern Iowa

Richard Snyder
Wartburg College

In a time when fewer resources force school leaders to make critical decisions, the data-driven decision-making model continues to offer promise. This research project provides observations about factors used for decision making from 14 district leaders across five Iowa school districts. Placing these factors for decision making within the framework of a data driven decision making model provides insights for school leaders striving to increase the efficiency and effectiveness of decision making in their own districts. In doing so, educational leaders might ultimately implement educational change with greater effectiveness.

Keywords: Data-driven decision-making, data driven, leadership

In an environment of increasingly limited resources, educational leaders must carefully consider a variety of factors when making decisions for their constituents. The Professional Standards for Educational Leaders (National Policy Board for Educational Administration, 2015) suggest that effective leaders use "relevant data" to develop and promote a vision for the school; however, no mention is made regarding the data sources school leaders should prioritize. As such, the data school leaders should use in making decisions for their constituents is uncertain. Mandinach and Schildkamp's (2021) literature analysis identified five misconceptions of data use in schools, one of which is data being synonymous with standardized test results. Some critics have argued that institutions of higher education should increase their effort to help educators understand and use assessment data as a means of school improvement (Bocola & Boudett, 2015; Firestone & González, 2007). Others have suggested data sources should be more broadly defined to include student learning data, demographic data, school process data, and perception data (Lange et al., 2012; Mandinach et al., 2019). Based upon an analysis of school leaders' practices in the use of data-driven decision making, Sun and colleagues (2016) assert that "clear guidelines regarding what data to use, when, by whom and how need to be developed and implemented in schools" (p. 109). On the other hand, a lack of clear guidelines and ineffective use of data can hinder positive activity by stakeholders (Jimerson et al., 2019).

Use of data in schools does not happen in isolation, but is instead influenced by a variety of system, organization, and localized factors (Roegman et al., 2018; Schildkamp, 2019). Gannon-Shilon and Schechter (2017) theorize school leaders may be influenced by "sense-making triggers" in which emotional reactions to events trigger a new understanding of previously ambiguous circumstances. To better understand school leaders' use of data within school improvement, Schildkamp (2019) suggests a variety of methodologies are needed which include small-scale studies investigating educators' sense-making.

This research seeks to identify influences of decision-making models among educational leaders in participating K-12 schools. Through semi-structured, phenomenological qualitative interviews with 14 district leaders, we aim to understand the factors influencing educational leaders in their school improvement efforts.

The primary research questions are...
1. What factors contribute to school improvement initiatives undertaken by educational leaders?
2. What types of data do educational leaders draw upon when making decisions for their constituents?
3. What motivates the decision-making models that educational leaders utilize in their school improvement efforts?

Literature Review

The past 50 years rendered a variety of educational leadership models based upon the demands on school leaders and the changing reality in which they work. In the 1980s, the instructional leadership model emphasized developing the skills of teachers to increase their effectiveness with students (Hallinger et al., 2020). In the early 2000s, transformational leadership sought to provide a larger context of mission and vision while continuing the development of teacher effectiveness (Leithwood & Jantzi, 2006; Sun & Leithwood, 2012). During this time, moral and ethical leadership, participative leadership, managerial leadership, contingent forms of school leadership (Leithwood & Duke 1999), as well as overarching leadership models were prevalent in the literature (Leithwood & Louis 2012; Waters et al., 2003).

The advent of *No Child Left Behind* marked a turning point in educational leadership. With a heightened level of accountability in student performance on standardized testing, Leithwood and Lewis (2012) recognized the increased emphasis on data use in leadership and student learning. Leithwood and

Lewis (2012) analyzed various issues related to leadership, data use, and increased student achievement. While numerous aspects of data-based decision making and the direct connection to student learning remained unclear, high data use schools did tend to correlate to higher student achievement. Drawing upon Ikemoto and Marsh's (2007) framework that considered who used data, the sources of data, and the complexity of data analysis, Leithwood and Lewis (2012) found that school leaders set the tone for effective data use in their districts. While data collected tended to focus on problems in student learning rather than causes or potential solutions, those schools that drew upon data sources beyond merely student performance tended to provide more effective solutions to their educational problems (Leithwood & Lewis, 2012). More recently, Datnow and Park (2018) proposed school leaders balance the use of data in schools to ensure equitable opportunities and outcomes for students. Indeed, Schildkamp (2019) concluded one of the most important enablers and barriers to using data to improve teaching and learning is leadership.

As the use of data among educational leaders grew, so too did the need to identify leadership tasks to further analyze the types of data used for those respective tasks. Sergis and Sampson, (2016) identified 11 different leader tasks:

T1) learning process monitoring: identifying types of instructional practices and processes used

T2) learning process evaluation: analysis aimed at improving the teaching and learning process of the school

T3) learner performance monitoring: micro- and meso-level data related to learners' academic performance

T4) learner performance evaluation: diagnostic and formative data to monitor progress during the learning process

T5) curriculum planning: issues related to current or alternative curriculum

T6) teaching staff management: teaching performance (processes and competencies) and operations (attendance, demographics, payroll)

T7) teaching staff professional development: identification of teaching staff competencies and shortcomings

T8) district stakeholder accountability: formulating and sustaining communication channels with stakeholders

T9) infrastructural resource management: hardware and software equipment

T10) financial resource management: budget, funding, and accounting

T11) learner data management: overall considerations of learner data (demographics, academic background - Sergis & Sampson, 2016, pp. 152-53).

Educational leaders undoubtedly deal with a significant amount of data. This framework of 11 tasks provides leaders a means to identify and distinguish the various types of data and thereby specify more clearly the educational measures under consideration.

Sergis and Sampson's (2016) extensive quantitative study analyzed data use across 70 school leadership decision support systems (SL-DSS) to provide insights regarding data-based decision making in any district. Citing Marsh and Farrell (2014), the study reinforced the reality that time, availability and quality of data, and the competency of school leaders to work with this data hindered effective district decision making. While school leaders focused most directly on student performance data as mandated by external agencies in this study, comparatively less data was collected and analyzed regarding teaching practice (Sergis & Sampson, 2016). The study raises an intriguing question: What types of data *should* leaders be gathering and using when making decisions?

Sun, Johnson, and Przybylski (2016) addressed similar questions regarding leadership tasks and data use in their analysis of 60 studies of data use by principals. Their data-driven leadership model identified four leadership domains with 18 various practices. While they found that data use among

principals remained inconsistent, Sun and colleagues (2016) concluded that educational leaders might increase student achievement by focusing on key leadership domains of data-based goal setting: developing teachers' decision-making capacity, building a data-wise culture in schools, and improving instruction based on data. The eleven leadership tasks from the Sergis and Sampson (2016) study, along with the four domains of leadership from the Sun, Johnson, and Przybylski (2016) study serve as the conceptual framework for this research.

As the literature and framework illustrate, data use and decision making continue to be important issues for educational leaders. Previous studies analyzed the use of data in New York City schools, Australia, Pennsylvania, Virginia, and other jurisdictions (as cited in Sun et al., 2016). To our knowledge, this is a unique study in Iowa leadership and data use in decision making. In addition, the recent implementation of the state's Teacher Leadership and Compensation Grant to build capacity for data use among instructional leaders brings a unique component to the current need for data in decision making. Through this grant, every Iowa school district is allocated per pupil funding for the unique purpose of developing collaboration and leadership capacity within teachers to support the school's improvement efforts (Iowa Department of Education, 2021). Our research applied the decision-making framework described above to 14 educational leaders in five Iowa school districts while considering the school improvement initiatives underway in each of those districts.

Method

A purposive sample (Merriam, 2015) was generated by extending an initial email invitation to five superintendents in five Iowa school districts. Researchers extended invitations to superintendents of these districts based upon size (1,000 to 1,500 students), proximity, and some familiarity with district initiatives and those administrators (Rubin & Rubin, 2012). Superintendents assisted with recruitment by forwarding the invitation to participate to the educational leaders within their districts and thereby increasing randomness (Corbin & Strauss, 2015).

Ultimately, 14 educational leaders (superintendents, district office administrators, and principals) from five Iowa school districts provided qualitative data through phenomenological, semi-structured interviews (Seidman, 2013). Interviews provided insight into the phenomenological decision-making experience of each educational leader. Responsive interviews provided an effective method to capture the perceptions, thoughts, and observations of initiatives currently underway in each context (Rubin & Rubin, 2012). Table 1 provides an overview of each school district's demographics and participating administrators.

Researchers conducted the first two interviews together, to verify questions and general format prior to conducting further individuals separately. Researchers asked participants reasonable, semi-structured questions (Brown & Danaher, 2019) about current district initiatives, as well as data used to consider, implement, and evaluate current initiatives. Ten interviews were conducted face to face, with four conducted through Zoom.

Researchers digitally recorded, and then transcribed, all interviews to provide hard-copy records for coding and analysis (Marshall & Rossman, 2021; Rubin & Rubin, 2012). Upon the completion of interview transcription, member checks provided participants the opportunity for participants to review transcripts and verify their thoughts and address any areas of concern (Brown & Danaher, 2019; Candela, 2019). Participant responses were axial coded based upon common elements from the interviews (Corbin & Strauss, 2015). The two authors first completed coding independently, then collaborated to compare and verify coding methods (O'Connor & Joffe, 2020).

Following the model of Sergis and Sampson (2016), researchers also tallied data points from each interview as an indicator of the various leadership tasks with which leaders engaged. Using the 11

leadership tasks cited above, researchers gleaned transcript data to identify various tasks referenced by district leaders and the respective tasks of emphasis within each district. See tables two through six for these leadership task tallies.

Table 1

District Demographics

District	Participants	# of students (approximate)	Caucasian students (%)	Students qualifying for free/reduced lunch (%)	4 year Graduation Rate (%)
District A	S, HS, ML	1,000	94%	28%	97.9%
District B	S, CO	1,500	95%	25%	96.3%
District C	S, HS, E	1,500	80%	54.5%	91.5%
District D	S, CO	1,200	60%	35%	95.5%
District E	S, HS, ML, E	1,200	90%	60%	85%

Statistics from 2020 Iowa Department of Education School Performance Profiles.

S = superintendent; HS = high school administrator; ML = middle level administrator; E = elementary administrator; CO = central office administrator

Findings

While all participants cited a variety of factors affecting decision making across their districts, each district tended to focus on certain factors more than others. The following narratives briefly describe each district, the participants, and motivating factors within their educational context.

District A

All three leaders at District A frequently mentioned school improvement foci that were being implemented based upon *influencers close to home*. For example, the superintendent highlighted partnering with three neighboring school districts to share services and provide opportunities for teachers to collaborate. District A leaders preferred to partner with "people we meet" such as area superintendents and principals to understand what is working in *their districts* rather than lean into the state department of education or other sources of school improvement guidance. One principal described this mindset as "knowing that so many other schools were already having this in place...was probably one of the biggest drivers of what we can do." In turn, administrators admitted they were not concerned with state assessment or other standardized data because they "did not tell the full story." Volunteer teams of

teachers often formed for the purpose of working through a change initiated by building or district leadership.

Table 2
District A Leadership Tasks

	S	HS	ML
T1 Learning Process Monitoring	1	4	2
T2 Learning Process Evaluation	3	3	1
T3 Learner Performance Monitoring	7	2	3
T4 Learner Performance Evaluation	4	2	4
T5 Curriculum Planning	2	3	1
T6 Teaching Staff Management	7	4	5
T7 Teaching Staff PD	7	5	2
T8 District Stakeholder Accountability	3	5	2
T9 Infrastructural Resource Management	2	1	
T10 Financial Resource Management	6		1
T11 Learner Data Management			1

Table 2 reflects district leader focus on T6 – Teaching Staff Management, and T7 – Teaching Staff Professional Development. Throughout the interviews, District A leaders addressed their ongoing efforts to develop collaboration to increase teacher effectiveness in working with the whole child. Collaborative efforts included interaction with external districts and educational service agencies, as well as internal discussions among teaks of administrators, instructional coaches, guidance counselors, and teachers.

District B

Both participants – the superintendent and the director of curriculum and instruction – referred to their long-standing district vision and school improvement model. This model, often referred to as "The District B Wheel," provided the foundation for data-driven decision making guided by instructional coaches, then implemented through teachers. Following the recent retirement of a long-tenured superintendent, the existing district model provided the new district leader the framework for her work in five priority areas as defined by the school board. The superintendent was keenly aware of demographic changes within the district that may lead to attendance center re-locations or closures. In addition, the increase of young families in several of the district's communities was creating the potential for additional pre-K services and corresponding classroom space. Regular meetings with civic leaders and district families helped gather information and share potential plans for more effective communication with all constituents. The director of curriculum and instruction spoke enthusiastically about building capacity among teacher teams and their analysis of instructional success using student data.

Table 3
District B Leadership Tasks

	S	CO
T1 Learning Process Monitoring	5	3
T2 Learning Process Evaluation	4	9
T3 Learner Performance Monitoring	6	7
T4 Learner Performance Evaluation	2	5
T5 Curriculum Planning	3	1

T6 Teaching Staff Management	5	4
T7 Teaching Staff PD	2	4
T8 District Stakeholder Accountability	7	2
T9 Infrastructural Resource Management	4	1
T10 Financial Resource Management	6	
T11 Learner Data Management	8	2

Table 3 highlights the different leadership tasks and focus for leaders within a district. The superintendent was in tune with district demographics and communication among numerous constituents within the district (T11 – Learner Data Management and T8 – District Stakeholder Accountability respectively). In contrast, the director of curriculum and instruction focused more on teacher teams that analyzed student performance data to improve instruction (T2 – Learning Process Evaluation) and various factors affecting learner performance (T3).

District C

All three educational leaders spoke consistently about *system-ness*. In his second year in the district, the well-read and energetic superintendent invested time developing the mission, vision, and values, striving to establish systemic structures based upon a distributive leadership model. Extensive observation data and consistent communication of mission, vision, and values with all constituents helped build capacity at all levels of learning in the district. The two principals were eager to provide several recent and practical examples of the distributed model that included asking questions of teachers and students, reminding those involved of parameters within the decision-making matrix, and then encouraging initiative. By increasing the responsibility and accountability of individuals with whom they worked directly, administrators appeared to remove responsibilities from their direct purview, while distributing leadership to other actors. While the elementary principal admittedly worked more with academic data, both building administrators acknowledged the importance of student data applicable to their respective attendance centers.

Table 4
District C Leadership Tasks

	S	HS	E
T1 Learning Process Monitoring	5	1	4
T2 Learning Process Evaluation	8		4
T3 Learner Performance Monitoring	4	8	9
T4 Learner Performance Evaluation	3	3	4
T5 Curriculum Planning	3	2	
T6 Teaching Staff Management	7	9	4
T7 Teaching Staff PD	12	12	8
T8 District Stakeholder Accountability	8	4	5
T9 Infrastructural Resource Management	1		
T10 Financial Resource Management	1		
T11 Learner Data Management	5	1	

Table 4 highlights all three district leaders' emphasis on building an infrastructure that develops professional capital among teachers (T7). This shared leadership model emphasized increased capacity for meeting student needs unique to the community (T3), while simultaneously being sensitive to constituents within the community (T8).

District D

Keen awareness of student demographics and implementation of state initiatives with the guidance of the regional education service agency marked important factors in district decision making. The superintendent and director of instructional services spoke to realities within the district about limited opportunities for graduates and current state initiatives that resonated with the social-emotional needs with their stakeholders. The superintendent highlighted greater awareness of school board accountability and resource management, while encouraging personal and professional development for his administrative team. The director of instructional services spoke of her enthusiasm for building capacity in teachers through district instructional coaches. A highly communicative administrative team worked effectively to encourage fidelity of initiatives in teacher teams. Like District B, the director of instructional services reiterated the district's focus on building capacity among teachers as a primary function of her role.

Table 5
District D Leadership Tasks

	S	CO
T1 Learning Process Monitoring	3	
T2 Learning Process Evaluation		3
T3 Learner Performance Monitoring	8	7
T4 Learner Performance Evaluation	1	6
T5 Curriculum Planning		4
T6 Teaching Staff Management	4	4
T7 Teaching Staff PD	3	10
T8 District Stakeholder Accountability	5	2
T9 Infrastructural Resource Management	1	1
T10 Financial Resource Management	3	3
T11 Learner Data Management	3	1

Like District B, data from Table 5 highlights the different focal points between the superintendent and the director of curriculum and instruction. While both district leaders related thorough knowledge of community factors affecting their student population (T3), the superintendent used this knowledge with the school board (T8) while the director of instructional services focused on professional development for teachers (T7).

District E

Leaders at District E, while aware of state mandates and policies, decisions appeared to be motivated by local considerations such as staff culture, office referral data, and teacher-initiated changes. District's E's instructional leadership team, separate from a district operations team, sat on top of the hierarchy, while building leadership teams with rotating representatives provided ample staff voice into decision making. For example, the high school principal commented, "Very few times do I make large-

scale decisions without the input of that [building leadership] team or that group gives me input and I bring it to our [district] instructional [leadership] team…"

Table 6
District E Leadership Tasks

	S	HS	ML	E
T1 Learning Process Monitoring	2	4	2	2
T2 Learning Process Evaluation		4	4	
T3 Learner Performance Monitoring	10	13	9	6
T4 Learner Performance Evaluation	8	3	8	3
T5 Curriculum Planning	1	5	7	7
T6 Teaching Staff Management	7	4	2	3
T7 Teaching Staff PD	7	4	12	4
T8 District Stakeholder Accountability	2	5	9	5
T9 Infrastructural Resource Management		4	1	6
T10 Financial Resource Management	3	4		
T11 Learner Data Management		4	4	

Like District D, Table 6 reflects the keen awareness of District E leaders with the demographic impact on teachers and learners (T3). And, like the director of instructional services from District D, District E principals similarly worked toward more effective collaboration through teacher teams (T7) and community engagement (T8) to address those demographic distinctives.

Discussion

Our analysis generated three overarching themes. First, interviews and subsequent analysis suggested that two district decision making models were centered upon the district mission, vision, and values while three districts responded to local influences such as community needs or schools in local proximity. Second, by using the Sergis and Sampson (2016) model to tally leadership tasks mentioned in the interviews, researchers could begin to see focal points within each district. A third theme identified through data analysis was the tendency toward qualitative influencers in decision making.

Examples of prioritizing decisions within the mission, vision, and values include District B in which leaders frequently referred to their "wheel" model when considering both academic initiatives and capital improvement projects. Within District C, leaders were quick to articulate the freedom within fences in which staff were encouraged to operate if it was within the purview of the district's overall mission. While ultimate authority for many decisions in these two districts remained in the hands of educational leaders, their staff and constituents appeared to understand their role in providing meaningful and timely input. The emphasis on staff input evident in both districts aligns with Sun and colleagues (2016) domain of developing teachers' decision-making capacity. On the contrary, the remaining three districts depended upon influencers close to home, yet outside of their school walls. Whereas District D leaned upon the guidance from an intermediate service agency, District A leaders found value in observing what was working in school systems around them before choosing to adopt these initiatives themselves. Within these three remaining districts, there appeared to be goals or initiatives established that were not necessarily based upon data or the input of staff, which runs contrary to two domains suggested by Sun and colleagues (2016).

In addition to observing the tendency of district decision making to be mission focused or externally initiated, researchers also identified leadership tasks from Sergis and Sampson (2016) mentioned more frequently in individual districts as well as among different leaders within those districts. All district leaders readily cited awareness of demographic information and the impact of those demographics on students. In addition to this contextual awareness, however, some district leaders focused more on professional development and capacity building (T7), while others focused on building networks with constituents (T8). This second theme supports the ability to, if not the importance of, identifying the leadership tasks around which conversations take place within school districts (Sergis & Sampson, 2016; Sun et al., 2016). The results of this study align with previous research suggesting data use in schools is influenced by a variety of system, organization, and localized factors (Roegman et al., 2018; Schildkamp, 2019). Finally, the participants in this study were all from rural schools, which may enhance their awareness of localized expectations (Wieczorek & Manard, 2018).

The third theme identified through data analysis suggested that educational leaders across all five schools in our investigation expressed a preference, and perhaps a dependence, upon qualitative influencers. As such, the results of the current study are consistent with prevailing literature suggesting that data-driven decision making continues to evolve. Recent studies highlight educational leaders' increasing, yet moderate use of quantitative data to improve their schools (Sun et al., 2016), a need to enhance their capacity to make data-driven decisions (Pak & Desimoine, 2019) and models they may consider to do so (Marsh & Farrell, 2014). Yet, the district models, whether mission-motivated or locally influenced, suggest these educational leaders appear to be most comfortable basing their decisions upon qualitative rather than quantitative measures. While quantitative, data-driven, decision-making has been framed as "the new instructional leadership" in schools (Halverson et al., 2007), the influences educational leaders shared in the current study were often far from it, further distancing these school leaders from the data-based goal setting and data-wise culture domains proposed by Sun et al. (2016). The results of the current study support Mandinach and Schildkamp's (2021) assertion that data used in schools is not synonymous with standardized test results. Furthermore, these districts drawing upon a balance of data sources beyond student learning metrics may be able to identify more effective solutions to their local problems (Leithwood & Lewis, 2012).

Significance of the Study

Current emphasis on data use and decision-making raise important issues among educational leaders. Factors affecting decisions, and data sources to inform those factors rank high among those issues. This unique study in Iowa leadership and data use in decision making highlighted the different influences in five districts, the leadership tasks more readily identified in those districts, and the tendency toward qualitative influencers. The recent implementation of the state's Teacher Leadership and Compensation Grant to build capacity for data use among instructional leaders was prominent in use, or in the types of leadership tasks outlined in each district.

While limited to only five Iowa school districts compared to the analysis of district decision making across 70 school districts (Sergis & Sampson, 2016) or 60 studies of principals and data use (Sun et al., 2016), this study does provide educational leaders the opportunity to focus on two talking points: 1) What tasks demand decisions in my role as educational leader? And 2) What data do leaders consider when making decisions?

This study may foster discussion among educational leaders regarding data use and decision making in their local contexts, while raising the awareness of individuals within each district specifically identified to deal with data. While additional research should consider understanding the responsibilities

unique to various district positions as well as the need for district leaders who focus specifically on data use, discussions across districts will only move us closer to desired student achievement goals.

Conclusion

A variety of factors contribute to the school improvement initiative efforts undertaken by the educational leaders in this study. Several district decision-making models were centered upon the district mission, vision, and values while three districts responded to local influences such as community needs or schools in local proximity. Although previous accountability laws such as NCLB and ESSA have enhanced stakeholders' attention towards accountability in student performance on standardized testing, the data school leaders are utilizing to inform their improvement efforts may not overlap. Furthermore, previous leadership domains such as data-based goal setting and building a data-wise culture may be less important when compared to developing teachers' decision-making capacity. Clarifying processes and conversations in local districts will identify the data currently used in decision making, while moving toward more effective use of data to improve student achievement.

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