

The Need for a Broader Understanding of Data Under the Professional Standards for Educational Leaders

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The purpose of this study was to examine administrators' use of data, their perceptions of data, and what their expectations were in terms of teacher use of data. In conjunction with this examination will be a closer look at the new Professional Standards for Educational Leaders (PSEL) to determine the connections as well as the disconnections to the way school leaders currently use data in their everyday practice and the standards of practice called for by the PSEL. A qualitative approach using interviews, focus groups, and document review was used to answer a question about the adequacy of current data-driven decision practices of school leaders in light of the new Professional Standards for Educational Leaders. Findings suggest that the participants in this study used data to inform their practice as it relates to the four PSEL standards focusing on instructional leadership. However, there was little evidence that administrators used data to inform their practice related to the other six PSEL standards related to cultural awareness, organizational culture and climate, and community awareness. As a result, we suggest that the new PSEL standards demand a broader view of data and its use in decision making.

Data are defined in a variety of ways within the field of information science (Bates, 2005; Zins, 2007); however, it is perhaps best conceptualized as information that exists in the environment and is transformed into something meaningful, relevant, and useful for a specific, practical purpose (Davenport & Prusak, 1998). Despite this theoretically broad conceptualization of data, in practice educators often view data exclusively as statistical facts obtained from quantitative measurements – most often assessments of student learning (Farrell & Marsh, 2016). But today’s school leaders can no longer afford to view data in this limited manner. According to the recently adopted Professional Standards for Educational Leaders (PSEL), school leaders must shift their focus beyond issues of curriculum and instruction. Now educational leaders must also attend to school and community culture, student and faculty well-being, cultural competence, and social justice.

The extent to which administrators’ use of data can support fulfilling the broader responsibilities outlined by the PSEL is currently unknown. Thus, the purpose of this study is to examine administrators’ use of data in relation to the PSEL. This examination provides valuable insights to the field on how educational leaders might broaden their scope of data and its use as they are held accountable to new standards that reach beyond traditional instructional leadership concerns.

Data Use by School Leaders

Accountability for student learning drives the use of data for instructional decision-making purposes; therefore, the importance of using data to inform instruction and everyday decisions made in the classroom is well documented (Dunn, Airola, Lo, & Garrison, 2013; Marsh, Pane, & Hamilton, 2006; Schifter, Natarajan, Ketelhut, & Kirchgessner, 2014). Often, this use is focused on student achievement data which is readily available through various standardized tests – most often mandated by the accountability policies and delivered as classroom and school performance reports. In addition, there is a plethora of recent literature that addresses data use by teachers and school leaders. Almost all of this literature explores the use of data for instructional purposes. As part of their instructional planning and decision making, administrators use test scores, graduation rates, and similar academic indicators to evaluate teacher effectiveness and the status of their schools in relation to external accountability mandates (Lasater, Albiladi, Davis, & Bengtson, 2019; Hamilton et al., 2009).

Administrators also play a critical role in establishing the conditions necessary for effective data use within their schools (Lasater et al., 2019; Gerzon, 2015; Lange, Range, & Welsh, 2012; Sun, Przybylski, & Johnson, 2016). Sun et al. (2016) identified three leadership categories that promote and develop data use among teachers and school administrators: personal support, technical support, and cultural support. First, personal support refers to the role of principals in providing support through modeling or conferencing to help teachers understand how to use and make meaning of the data. Similarly, it is important for school leaders to be knowledgeable of data use, engage in a discussion with teachers about data, and offer the support that teachers need to fully engage in data-driven decision making (Sanzo, Sherman, & Clayton, 2011). This will create a positive environment where data are valued and used effectively by teachers. With modeling, school leaders can assist teachers by observing teachers’ use of data and explaining or demonstrating how to interpret, respond, or act on data (Marsh & Farrell, 2014).

Second, teachers need technical support which calls for providing teachers with adequate time, a working system of data collection and use, and professional development opportunities to develop data literacy (Sun et al., 2016). Along with professional development from the district,

school leaders play a critical role in supporting teachers in the use of data at the school level (Levin & Datnow, 2012). These professional development opportunities increase teachers' capacity to make meaning of students' data and change the classroom instruction accordingly. However, not having enough time is often cited by teachers as an obvious barrier to data use (Ikemoto & Marsh, 2007; Park & Datnow, 2009; Mandinach, 2012). Teachers indicate that they do not have time to be involved in the process of collecting data, analyzing data, and making decisions about instruction based on students' data.

Finally, to be able to use data, school leaders need to provide teachers with cultural support (Lasater et al., 2019; Sun et al., 2016). Research has emphasized the significant role of school leaders in developing and creating a culture of data use in their schools (Datnow & Park, 2014; Gerzon, 2015; Hamilton et al., 2009; Lange et al., 2012; Mandinach, 2012; Mandinach, & Gummer, 2013). This includes developing a system of collaboration, establishing a shared vision, and trust among teachers and school leaders in terms of data use (Gerzon, 2015). Fostering a school data culture also includes formulating goals and expectations for data use (Levin & Datnow, 2012), providing teachers with time, resources, and assistance to make meaning from data (Gerzon, 2015), building trusting and collaborative relationships with teachers (Levin & Datnow, 2012; Tschannen-Moran, 2004), and maintaining the sustainability of data use (Sun et al., 2016).

The PSEL Connections to Data

Administrators' use of data has been emphasized under the instructional leadership paradigm encouraged by the former ISSLC standards; yet, the PSEL not only emphasizes instructional leadership, it also accentuates cultural awareness, equity, community of care, and school culture and climate issues (National Policy Board for Educational Administration [NPBEA], 2015). The NPBEA explains:

The Standards have been recast with a stronger, clearer emphasis on students and student learning, outlining foundational principles of leadership to help ensure that each child is well-educated and prepared for the 21st century. They elevate areas of educational leader work that were once not well understood or deemed less relevant but have since been shown to contribute to student learning. (p. 2)

This augmentation of the standards requires school leaders to move beyond the realm of the instructional leader. The NPBEA (2015) charges that:

...educational leaders must pursue all realms of their work with unwavering attention to students. They must approach every teacher evaluation, every interaction with the central office, every analysis of data with one question always in mind: How will this help our students excel as learners? (p. 3)

The NPBEA does not directly specify what types of data should be analyzed or what types of information should be sought; however, there is a strong call for socially just leadership. An effective leader is seen as one who not only understands the importance of good teaching and strong curricula, but also comprehends the essentiality of developing a community of care that is inclusive of all stakeholders (Smylie & Murphy, 2018). The broader scope of the PSEL is consistent with earlier calls from the field for an increased awareness of and responsiveness to social justice issues in 21st Century school leadership (Cambron-McCabe & McCarthy, 2005; Galloway & Ishimaru, 2015). Similarly, there have been critical reviews of the PSEL related to leadership for equity (Farley, Childs, & Johnson, 2019) and leadership for community engagement through organizing to address political issues (Welton & Freelon, 2019).

The broader conceptualization of effective school leadership as outlined by the PSEL may call into question the adequacy of school leaders' current data practices. Principals currently seek out academic achievement data (e.g., standardized assessments, benchmark assessments, etc.), but do they seek out data sources that speak to the culture and climate of their school? Do they use data to address equity issues that exist in public education? Do they use data to interrogate the politics embedded in the greater school community? Are school leaders using data in ways that allow them to fulfill the job responsibilities outlined in the PSEL? Ultimately, the relationship between the PSEL and administrators' use of data is currently unknown. This represents an important line of inquiry as leaders seek ways to meet the demands of the profession and facilitate student, school, and community improvement.

Methods

This qualitative study is pragmatic in nature – using the constructs of interpretive description to address complex problems of professional practice (Thorne, 2016). A research design that allowed us to examine the experiences of school leaders in their use of data and compare those experiences to the PSEL was important. Thus, interview and focus group data, along with document analysis, were used to answer the overarching research question:

- How does the use of data by current practicing school leaders in Arkansas relate to the new Professional Standards for Educational Leaders?

To answer this question, two sub-questions guided analysis:

- What types of data/information are seen as important or valued by educational leaders in Arkansas?
- What types of data/information are required to understand and execute sound leadership decision making that reflect the PSEL?

Data Sources

There were three data sources used in this study. First, a focus group was conducted with eight building level leaders (i.e., three elementary, three middle school, one junior high, and one high school) in one large, urban Arkansas district. District administration assisted in participant selection for the focus group by purposefully selecting building level leaders who engaged in and led data use initiatives within their respective schools. The purpose of the focus group was to facilitate an interactive discussion amongst building-level leaders related to their use of data and the value they placed in data-informed decision making.

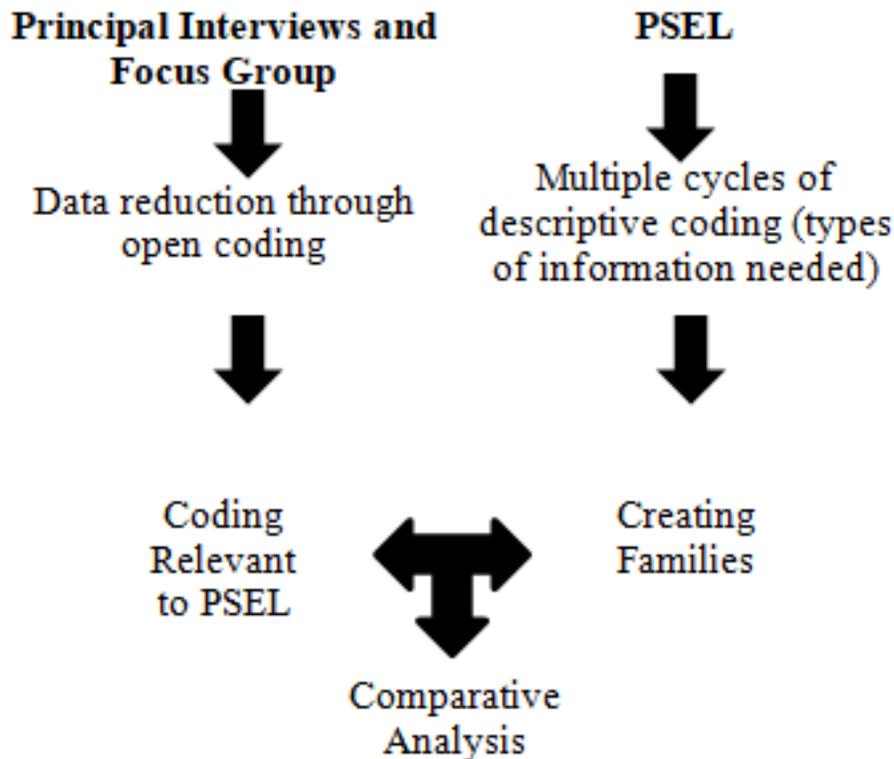
Second, in-depth interviews were conducted with eight school leaders from various regions of the state. School leaders spanning all grade levels participated in individual interviews. The participating leaders served in schools with enrollments ranging from 271 students to 582 students. Administrator experience ranged from 1 year to 15 years. The purpose of the interviews was to examine principals' views of data, the types of data they used, and the purposes for which they used data. Data from the focus group and in-depth interviews were analyzed using structural coding. In structural coding, a content-based phrase is assigned to data in relation to a particular research question (Saldaña, 2016) – in this study, research question one. Structural coding focused data analysis directly on the types of data valued by Arkansas administrators.

The final source of data was the PSEL document. Documents establish the interests, values, and ideologies of people and, therefore, should be examined critically to establish the

meaning of such social products (Saldaña, 2016). As the PSEL standards represent the values and expectations of the school leadership profession, an in-depth analysis of the standards provided a mechanism for better understanding the types of information (i.e., data) necessary for school leaders to successfully execute the standards. Document analysis involved coding the standards with terms or phrases that described the types of information school leaders would need to address a particular standard. After multiple cycles of coding, “families” were created to represent broader conceptual groupings of codes. The grouping of codes was similar to creating categories; however, the families allowed for any given code to have the possibility of belonging to multiple families as opposed to a single category. Finally, a comparative analysis between principal interviews, the focus group, and the PSEL document was conducted to compare and contrast administrators’ use of data to the new PSEL standards (see Figure 1).

Figure 1

Map of how the data analysis process was conducted with interview transcripts and the PSEL document as data sources.



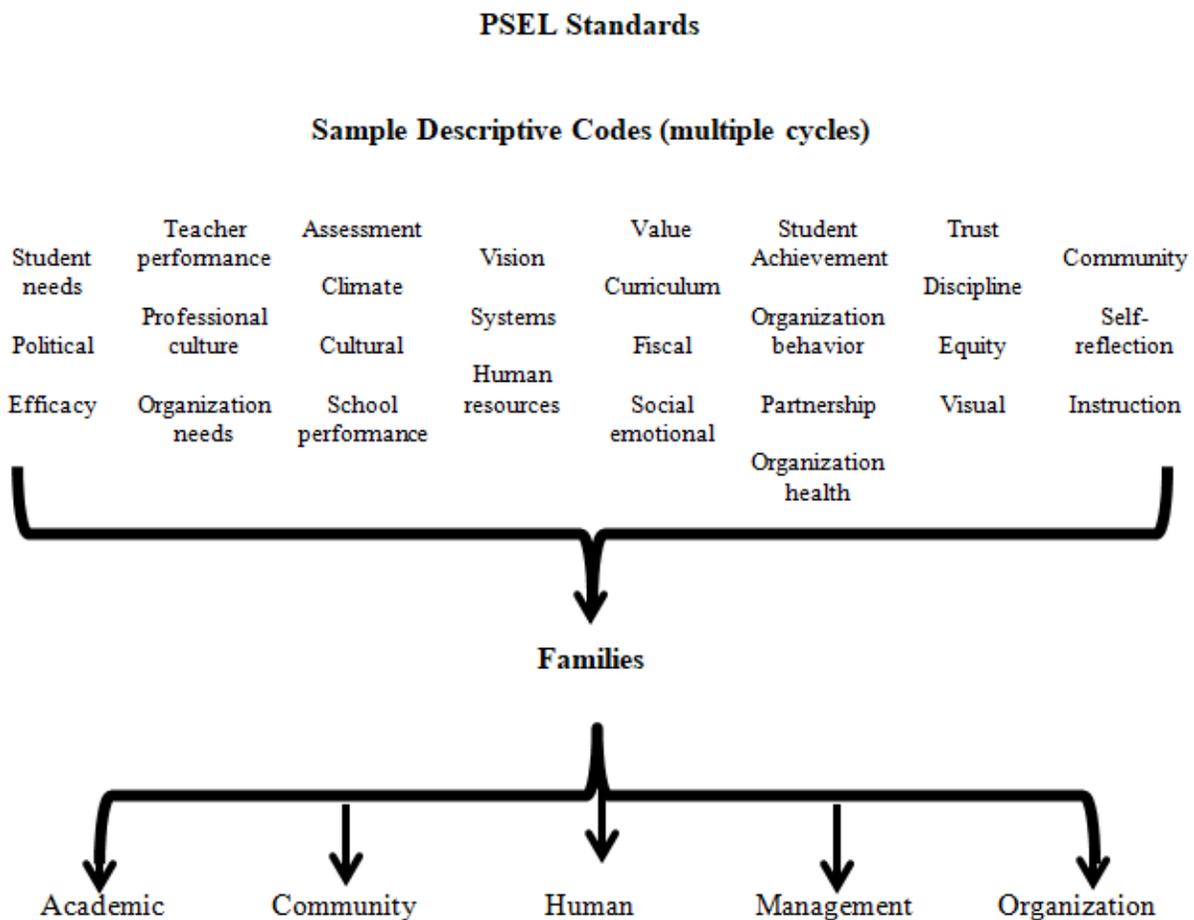
Findings from the Standards

Analysis of the PSEL document revealed five “families” of codes representing the types of information necessary for school leaders to perform their responsibilities (see Figure 2). Some codes were used in multiple families. The five families included: academic, community, human, management, and organization. The “Academic” family represented information related to student

achievement and learning (e.g., assessment, student achievement, instruction, etc.). “Community” represented information related to community concerns (e.g., cultural, political, trust, value, etc.). The “Human” family represented information that could assist in understanding the human being (e.g., efficacy, trust, needs, etc.). “Management” reflected information pertaining to the management aspects of school leadership (e.g., fiscal, systems, instruction, organizational needs, etc.). Finally, the “Organization” family identified information related to how the school as an organization functions (e.g., organization health, organizational behavior, systems, professional culture, etc.)

Figure 2

Example of a sample of the codes used to analyze the PSEL and the five ensuing families.



Using the families as an anchor in continuing our analysis, we organized the data to determine how the standards and families might be connected or related (see Table 1). For example, Standard 10: School Improvement had elements that spoke to all five families, and the “Human” family had connections to nine of the ten standards.

Table 1*Matrix showing the intersection of standards to families*

Standards	Families - Types of Data/Information Needed				
	Academic	Community	Human	Management	Organization
1. Mission, Vision, & Core Values		X	X		X
2. Ethics and Professional Norms	X	X	X	X	
3. Equity and Cultural Responsiveness	X	X	X		X
4. Curriculum, Instruction, and Assessment	X			X	
5. Community of Care and Support for Students		X	X		X
6. Professional Capacity of School Personnel	X		X	X	X
7. Professional Community for Teachers and Staff	X		X		X
8. Meaningful Engagement of Families and Community		X	X		X
9. Operations and Management			X	X	
10. School Improvement	X	X	X	X	X

Findings from the Field

Analysis of data obtained from the focus group and in-depth interviews with principals revealed three themes: using data to address curriculum, instruction, and assessment issues; using data to address student support; and, using data to address professional capacity and develop professional community. These three themes reflect the ways current school administrators described using data within their own professional practice.

Using Data to Address Curriculum, Instruction, and Assessment Issues

Participants often placed assessment data at the forefront of their instructional decision-making process. When school leaders were asked about why or how they use data, they most often responded with a direct emphasis on instructional purposes. Assessing the effectiveness of the taught curriculum, determining the effectiveness of the informal assessments used in individual classrooms, and aligning the curriculum to better meet the needs of students were reasons that administrators shared as being prominent in their decision-making processes. One middle school principal explained:

...we utilize the previous year's data coming over to identify, "Okay, these kids are weak in this area." So, we really want to use that data to say, "How do we want to focus our upcoming year's curriculum in this content?"...If a child is struggling, through observations, through weekly formative type assessments, then they'll make recommendations there.

Participants also reported using assessment data to monitor students' progress. Administrators used achievement data to determine if students were adequately exposed to the curriculum, to schedule instructional interventions for students, and to sort students into instructional groups by assessed ability. One principal described this process by stating:

Not all students are on the same level. They're not going to understand $2 + 2 = 4$ until they know what the number 2 is. If the standard says you're teaching them $2 + 2$, well you can teach them that all day long, until they understand what 2 is they're not going to get $2 + 2$. That's where our data really drives our instruction.... We just keep it [assessment data] on a Google Doc that they share between each other and they can put their kids' scores in, and then obviously it's on the data walls in her room. What it also helps us with in that data is when we start doing RTI groups we can sort that data off that spreadsheet and find out where our lower ones are and who needs the extra intervention.

Many times, multiple sources of data were cited by the participants as necessary to consider when problem solving and making instructional decisions. The term "drilling down" was used by principals when describing how they used multiple forms of data. As one principal stated:

I mean when we're talking about really drilling down, we're not just looking at achievement data on like a MAP test or whatever. We're talking about, okay we use that baseline but then we go back and do all these other kinds of assessments with students that are falling below to see exactly down to the level of missed cues...and when someone's reading, where are there comprehension issues or where are they breaking down at the word level?

As illustrated above, though most of participating principals described using multiple sources of data, they referred to multiple sources of student achievement or academic performance data – not data that might inform cultural awareness needs or identify community engagement issues.

Using Data to Address Student Support

Administrators described how they used achievement data to help support students. One way administrators used achievement data to support students was by ensuring they were placed in academic groups that met their learning needs. As one principal explained:

We've been using MAP data for test results, literacy and math...and that has been very helpful for us because it can pinpoint those areas and tell us exactly what kids are ready to learn next, so that's very helpful in terms of teachers knowing where to target that curriculum and where to head with their kids, then also in terms of interventions, who needs more support and what do they need more support on.

This statement not only reflects how using achievement data might help students, but also suggests that using information about student's academic performance can allow teachers to collectively engage in data-based decisions, which could contribute to the professional capacity of teachers.

In addressing student support issues, some principals indicated that information beyond student achievement data was important. One middle school principal suggested that while there is need for using student achievement data to address student performance issues, there are other types of data that should be considered as well:

For student accountability and teacher accountability, of course, the assessments and the testing. That would be the thing most everyone would look at....But we also have to take in consideration the attendance. What are the issues here, whether it's a sickness, these type [of] things. Just anything that would make a change in a student's behavior academically, we have to look into that.

Another principal shared that while she used formal data to make instructional decisions, she also valued more informal data:

One of the common things that we see, kids struggling, maybe behaviorally. It's very important that we collect that type of data too. Kid's behavior has, maybe we've seen a change in it, really, really struggling, instead of a teacher saying this kid is just out of control, they won't do this and focusing on that, the actual behavior. I ask, what do you know about him. Any changes in his family? And so we start to drill down and start to have conversations about changes...Academically, the same thing. Why does this kiddo still not know his name, what else is going on?

In this study, student achievement data was a prevalent focus of administrators, but some administrators also considered other types of data important when trying to meet the individual needs of students. These other sources of data (e.g., attendance, discipline, etc.) were used once a problem was identified for a particular student. Administrators subsequently used this non-assessment data to develop more intensive, individualized interventions for students. This is in contrast to administrators' use of achievement data. Administrators used school-wide achievement data to inform core curricular and instructional decisions. Thus, it seemed that administrators valued assessment data when making core, school-wide decisions; whereas, they used non-assessment data primarily when addressing individual student needs on a case-by-case basis.

Using Data to Address Professional Capacity and Develop Professional Community

Throughout the narratives of the participating principals, student achievement data was consistently tied to the work of professional learning communities (PLCs) and professional development initiatives. School administrators saw the use of data to anchor PLC discussions as a

way to develop the capacity of their teachers and to allow for the increased relinquishment of instructional decision-making to teachers. In essence, PLCs were seen as the vehicle for teachers using data and developing greater capacity with data-based decision making:

My expectations are for my teachers to feel comfortable enough to discuss. I expect them to meet and discuss, to talk about the students' needs, and actually, to address the students' needs based upon data...What I wish for my staff and for my faculty is that they develop a culture — and I believe that they have a culture — where they can share best practices of utilizing data that helps them to grow and feel confident as an educator.

While PLCs are considered a structure for professional development by many principals, there was also evidence that principals saw data as the fuel for making decisions about professional development that was outside of PLC activity. For example, one middle school principal talked about how data drove her decision to pursue professional development for her teachers in the area of writing instruction:

Professional development comes from that [data]. We saw a need this year for writing...Okay, I need to budget money more so it goes towards this PD. I need to get my teachers in. And then, of course, that brings “do we do this during school, or we'll wait until this summer?”...That's what we're working on right now. It was from the data showing that we needed to improve our writing skills.

Achievement data represented a catalyst for professional development, and ultimately, school improvement. In fact, making schools more effective was the driving force for administrators' use of data in this study; however, student achievement data was the predominant type of data referred to when talking about school improvement. Overwhelmingly, school leaders' accounts of their data use referred to the importance of student achievement data as the main driver for school improvement efforts.

Comparing Administrators' Use of Data to the PSEL

The principal focus group and interviews produced data indicating that school leaders in this study valued using data to drive instructional decisions with a major emphasis on using assessment data to identify teaching and learning issues in their schools. There is a relationship between administrators' use of data and the standards; however, that relationship only partially reflects the content of the PSEL. Findings indicate a relationship between what is known about administrator use of data and the following PSEL standards:

- Standard 4: Curriculum, Instruction, and Assessment;
- Standard 5: Community Care and Support for Students
- Standard 6: Professional Capacity of School Personnel; and
- Standard 7: Professional Community for Teachers and Staff.

These four standards share the same emphasis in the interview and focus group data. For example, in Standard 5 – Community Care and Support for Students, the main emphasis is placed on supporting students by sorting them into like groups based on student achievement data (we related this to strand c – *provide coherent systems of academic and social supports ...accommodations to meet the range of learning needs of each student*); however, the other strands of Standard 5 were not evident in the findings. For example, there was no evidence of principals using information that might help them make decisions about the demands of their school community (e.g., strand a – *build and maintain a safe, caring, and healthy school environment that meets the academic,*

social, emotional, and physical needs of each child; or, strand f – infuse the school’s learning environment with the cultures and languages of the school’s community, etc.).

In addition, administrators primarily used data consistent with the “Academic” and “Management” families of the PSEL; whereas, data related to the “Community,” “Human,” and “Organization” families were largely absent from administrators’ discussions. This suggests that administrators currently use data that will support them in meeting the academic and management aspects of their positions; however, they seemingly do not collect or use data to guide the community, human, or organizational aspects of their jobs.

Discussion

Findings from this study reveal a disconnect between the manner in which school leaders currently use data to inform their practice and the types of information valued within the PSEL. School leaders in this study emphasized student achievement data as the dominant type of data they valued and the primary source of data used to guide school improvement efforts. However, the adoption of the new PSEL standards has challenged school leaders to move beyond traditional notions of instructional leadership, and analysis of data from this study suggest leaders must broaden their use of data to include the community, human, and organizational aspects of their positions.

The focus on student achievement data is likely reflective of various school accountability policies that have defined school success almost exclusively by standardized test data. Thus, being an instructional leader has often equated to finding ways to raise student achievement scores. Furthermore, educational leadership preparation programs have emphasized the use of student achievement data as a major part of becoming a successful instructional leader – often times to the extent that approaching data-driven decision making is done solely through the lens of standardized student achievement data. However, the PSEL has challenged the field to develop a broader understanding of what constitutes effective leadership:

The Standards recognize the central importance of human relationships not only in leadership work but in teaching and student learning. They stress the importance of both academic rigor and press as well as the support and care required for students to excel. The Standards reflect a positive approach to leadership that is optimistic, emphasizes development and strengths, and focuses on human potential. (NPBEA, 2015, p. 3).

With the PSEL’s added emphasis on the areas of well-being, cultural responsiveness, community of care, and meaningful engagement of families and community, school leaders and leadership preparation programs must carefully reconsider the types of data that might be important in meeting *all* of the PSEL standards.

The new PSEL standards call for a multi-dimensional view of data, and findings from our study suggest that there are other data sources school leaders school consider as they facilitate school improvement. For example, data on organizational health and community relationships could provide invaluable information related to student and community needs, and collecting data in these areas could help leaders fulfill the community, human, and organizational aspects of their positions. It could also help them foster academic optimism with schools. Academic optimism emphasizes the role of trust, collective efficacy, and academic press in the transformation of schools as organizations (Dipaola & Wagner, 2018; Hoy, Tarter, & Hoy, 2006). In the formula for creating academic optimism, the nature of the culture of the organization (i.e., trust and collective efficacy) is just as important to understand and address as student achievement (i.e., academic press). To understand trust and efficacy in an organization, a leader must look at data that will

reveal the nature of the culture of their school, the needs of the community that surrounds their school, and the performance of the teachers and students who form the core of the school's activities.

Finally, the PSEL necessitates that school leaders no longer view student academic achievement as the desired outcome of schools. In our study, even when administrators used non-academic data, their primary purpose for using this data was to address the academic deficiencies of students. Yet the PSEL calls leaders to think more holistically about their students, schools, and communities. In other words, the PSEL encourages school leaders to recognize that the desired "end" in schools is no longer simply academic achievement; rather, the desired "end" is student, school, and community well-being. From this perspective, the types of information school leaders need to evaluate their progress toward well-being for students, schools, and communities must move beyond standardized achievement data.

Conclusion

The PSEL offers a refreshing framework as school leaders face the challenging task of transforming schools into dynamic learning organizations that will produce the citizens, workforce, thinkers, inventors, and leaders of the future. The move toward a more comprehensive look at what goes on in schools and their communities holds great potential in making meaningful change in schools as they serve increasingly diverse communities. To truly respond to the standards, school leaders must continue to provide academic press by paying attention to student achievement data. However, they must also be willing to collect, analyze, and act on data to better address students' well-being and issues of social justice. Such data is essential for leaders as they develop an awareness and understanding of the schools and communities they serve.

The disconnect between school leaders use of data and the current PSEL suggests that a new perspective on educational leadership practice is necessary. What would happen if school leaders used data related to school culture, faculty efficacy, and community perception with the same energy and intentionality as student achievement data? What would happen if data were used to think beyond the academic needs of students? What would happen if the field thought about instructional leadership in a more transformational way – a way in which the health of the organization and its people were prioritized *above* issues of grade-level proficiency, math scores, graduation rates, etc.? The PSEL presents an opportunity for school leaders, and those who prepare them, to redefine the term data and reconsider what data educators need to make sound decisions for sustainable school improvement. Student achievement is important and should remain so; however, the time has come to recognize that other types of information should be as deliberately and rigorously collected, analyzed and acted upon as student academic achievement data has been in the past.

References

- Bates, M.J. (2005). Information and knowledge: An evolutionary framework for information science. *Information Research*, 10(4). <https://files.eric.ed.gov/fulltext/EJ1082014.pdf>
- Cambron-McCabe, N., & McCarthy, M.M. (2005). Educating school leaders for social justice. *Educational Policy*, 19(1), 201-222. <http://doi.org/10.1177/0895904804271609>
- Datnow, A., & Park, V. (2014). *Data-driven leadership*. John Wiley & Sons.
- Davenport, T.H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business School Press.
- DiPaola, M.F., & Wagner, C.A. (2018). *Improving instruction through supervision, evaluation, and professional development* (2nd ed.). Information Age Publishing.
- Dunn, K. E., Airola, D. T., Lo, W. J., & Garrison, M. (2013). Becoming data driven: The influence of teachers' sense of efficacy on concerns related to data-driven decision making. *The Journal of Experimental Education*, 81(2), 222-241. <https://doi.org/10.1080/00220973.2012.699899>
- Farrell, C. C., & Marsh, J. A. (2016). Metrics Matter How Properties and Perceptions of Data Shape Teachers' Instructional Responses. *Educational Administration Quarterly*, 52(3), 423-462. <https://doi.org/10.1177/0013161X16638429>
- Farley, A.N., Childs, J., & Johnson, O.A. (2019). Preparing school leaders for America's wicked problems? How the revised PSEL and NELP standards address equity and justice. *Education Policy Analysis Archives*, 27(115), 1-26. <https://doi.org/10.14507/epaa.27.4229>
- Galloway, M.K., & Ishimaru, A.M. (2015). Radical recentering: Equity in educational leadership standards. *Educational Administration Quarterly*, 51(3), 372-408. <http://doi.org/10.1177/0013161X15590658>
- Gerzon, N. (2015). Structuring professional learning to develop a culture of data use: Aligning knowledge from the field and research findings. *Teachers College Record*, 117(4), 1-28.
- Hamilton, L., Halverson, R., Jackson, S. S., Mandinach, E., Supovitz, J. A., Wayman, J. C., Pickens, C., Martin, E., & Steele, J. L. (2009). Using Student Achievement Data to Support Instructional Decision Making. *United States Department of Education*. http://repository.upenn.edu/gse_pubs/279
- Hoy, W.K., Tarter, C.J., & Hoy, A.W. (2006). Academic optimism of schools: A force for student achievement. *American Educational Research Journal*, 43(3), 425-446. <https://doi.org/10.3102/00028312043003425>
- Ikemoto, G. S., & Marsh, J. A. (2007). Cutting through the "Data-Driven" mantra: Different conceptions of data-driven decision making. https://www.rand.org/content/dam/rand/pubs/reprints/2009/RAND_RP1372.pdf
- Lange, C., Range, B., & Welsh, K. (2012). Conditions for effective data use to improve schools: Recommendations for school leaders. *International Journal of Educational Leadership Preparation*, 7(3). <http://cnx.org/content/m45021/latest/>
- Lasater, K., Albiladi, W., Davis, W., & Bengtson, E. (2019). The data culture continuum: A grounded theory examination of school data cultures. *Educational Administration Quarterly*. <https://doi.org/10.1177/0013161X19873034>
- Levin, J. A., & Datnow, A. (2012). The principal role in data-driven decision making: Using

- case-study data to develop multi-mediator models of educational reform. *School Effectiveness and School Improvement*, 23(2), 179-201.
<https://doi.org/10.1080/09243453.2011.599394>
- Mandinach, E. B. (2012). A perfect time for data use: Using data-driven decision making to inform practice. *Educational Psychologist*, 47(2), 71-85.
<https://doi.org/10.1080/00461520.2012.667064>
- Mandinach, E. B., & Gummer, E. S. (2013). A systemic view of implementing data literacy in educator preparation. *Educational Researcher*, 42(1), 30-37.
<https://doi.org/10.3102/0013189X12459803>
- Marsh, J.A., & Farrell, C.C. (2014). How leaders can support teachers with data-driven decision making: A framework for understanding capacity building. *Educational Management Administration & Leadership*, 43(2), 269-289.
<https://doi.org/10.1177/1741143214537229>
- Marsh, J. A., Pane, J. F., & Hamilton, S. (2006). *Making sense of data-driven decision making in education: Evidence from recent RAND research*. RAND Corporation.
https://www.rand.org/pubs/occasional_papers/OP170.html.
- National Policy Board for Educational Administration. (2015). *Professional standards for educational leaders*. http://npbea.org/wp-content/uploads/2017/06/Professional-Standards-for-Educational-Leaders_2015.pdf
- Park, V., & Datnow, A. (2009). Co-constructing distributed leadership: District and school connections in data-driven decision-making. *School Leadership and Management*, 29(5), 477-494. <https://doi.org/10.1080/13632430903162541>
- Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Sage Publications.
- Sanzo, K.L., Sherman, W.H., & Clayton, J. (2011). Leadership practices of successful middle school principals. *Journal of Educational Administration*, 49(1), 31-45.
<https://doi.org/10.1108/09578231111102045>
- Schifter, C. C., Natarajan, U., Ketelhut, D. J., & Kirchgessner, A. (2014). Data-driven decision-making: Facilitating teacher use of student data to inform classroom instruction. *Contemporary Issues in Technology and Teacher Education*, 14(4), 419-432.
<https://www.citejournal.org/volume-14/issue-4-14/science/data-driven-decision-making-facilitating-teacher-use-of-student-data-to-inform-classroom-instruction>
- Smylie, M.A., & Murphy, J. (2018). School leader standards from ISLLC to PSEL: Notes on their development and the work ahead. *UCEA Review*, 59(3), 24-28.
<http://www.ucea.org/wp-content/uploads/2018/10/UCEAReviewColor1002.pdf#page=24>
- Sun, J., Przybylski, R., & Johnson, B. J. (2016). A review of research on teachers' use of student data: from the perspective of school leadership. *Educational Assessment, Evaluation and Accountability*, 28(1), 5-33. <https://doi.org/10.1007/s11092-016-9238-9>
- Thorne, S. (2016). *Interpretive description: Qualitative research for applied practice* (2nd ed.). Routledge.
- Tschannen-Moran, M. (2004). *Trust matters: Leadership for Successful Schools*. Jossey-Bass.
- Welton, A.D., & Freelon, R. (2019). A critical examination of the educational leadership standards: A community organizing perspective. In A. B. Danzig & W.R. Black (Eds.), *Who controls the preparation of education administrators?* (pp. 187-218). Information Age Publishing.

Zins, C. (2007). Conceptual approaches to defining data, information, and knowledge. *Journal of American Society for Information Science and Technology*, 58(4), 479-493.
<https://doi.org/10.1002/asi.20508>