Building the Foundation for Data-Based Decision Making: Creating Consensus on Language and Concepts

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Abstract

Data Based Decision Making (DBDM), the process of gathering, analyzing, applying, and sharing data in order to promote school improvement, has recently become a prominent process in the quest to assist students in attaining educational success and helping schools meet accountability benchmarks (Wayman, 2005; Poynton & Carey, 2006). This manuscript presents a pilot study undertaken in a Mid-Atlantic state to discern foundational understandings of DBDM by school staff. Results from the study reveal a lack of clarity on the foundational underpinnings of DBDM, as well as a lack of assessment literacy.

Data can help us—

- *clarify concerns and replace hunches with facts*
- *assess needs in order to accurately and effectively target our services and resources*
- *identify root causes of problems and possible solutions, so that we can solve the problem and not just address surface symptoms*
- *engage in ongoing, proactive enhancement of all aspects of the school and learning processes; data is an essential component for continuous school improvement (Bernhardt, 2004; Learning Point Associates, 2004).*

Recent clarion calls for educational accountability have dramatically changed the landscape of PK-12 public education in the United States; "standards-based accountability swept through the country during the late 1980s and 1990s with profound force, in a more concerted and coordinated effort than many earlier reforms" (Fuhrman & Elmore, 2004, p. 167). The most recent evolution of the standards-based accountability movement resulted in the reauthorization of The Elementary and Secondary Education Act (ESEA) in 2002, more commonly referred to as the No Child Left Behind (NCLB) Act (Duke, Grogan, Tucker, & Heinecke, 2003). The federal government designed NCLB to improve and promote achievement for all students utilizing research-based best practices (Kimmelman, 2006; Daresh, 2006).

Data Based Decision Making (DBDM), the process of gathering, analyzing, applying, and sharing data in order to promote school improvement, has recently become a prominent process in the quest to assist students in attaining educational success and helping schools meet accountability benchmarks (Wayman, 2005; Poynton & Carey, 2006). This manuscript presents a pilot study undertaken in a Mid-Atlantic state to discern foundational understandings of DBDM by school staff. Salient material from the literature is provided, including further defining of DBDM, DBDM processes, and barriers to successful use of data to make decisions.

NCLB mandates that schools and school systems must pass thirty-five benchmarks each year, most tied directly to state standardized tests, to retain federal accreditation. Each year the accreditation standards increase, requiring educational agencies to meet Adequate Yearly Progress (AYP) (Daresh, 2006). Recent proposed regulations to strengthen NCLB include additional reporting requirements (e.g., disaggregated data regarding graduation rates) (Spellings, 2008). If one sub-group does not meet AYP, the school is not accredited (Kimmelman, 2006). Schools failing to meet AYP benchmarks potentially face financial sanctions, school reconstitution, and other possible penalties from state and federal agencies (Kimmelman, 2006; Daresh, 2006).

State and federal accountability requirements have numerous schools struggling to find ways to meet the needs of all student learners in order to maintain full accreditation. While research supports the use of data to make informed decisions to improve instruction (Chrispeels, 1992; Earl & Katz, 2002), studies also indicate that there have been some difficulties in implementing DBDM, especially regarding data analysis (Stringfield, Reynolds, & Schaffer, 2001). Further complicating matters, DBDM processes may vary between and within schools and school districts. In addition, many administrators, teachers, school counselors, and other school personnel lack the training needed to successfully engage in effective use of data (Kaffenberger & Young, 2007). While DBDM is an essential component of moving schools from "good to great," the process used must be well-thought out and executed in order to be successful.

Given that "[a]n aim of data-driven decision making is to link the results of summative testing to formative information systems that teachers can use to improve instruction across schools" (Halverson, Grigg, Prichett, & Thomas, 2007, p. 163), it appears vital to have teachers

who are data-literate and collaboratively involved in the DBDM process. Love (2004) suggests that effective utilization of DBDM depends on these two factors, along with the establishment of a collaborative structure (opportunities are provided to work together on DBDM related tasks), as well as ensuring access to necessary data. Preuss (2007) also notes the need for DBDM to permeate school processes by observing that DBDM "is a system of deeply rooted beliefs, actions, and processes that infuses organizational culture and regularly organizes and transforms data to wisdom for the purpose of making organizational decisions" (p. 10). Yet, despite their prominence in instruction and improvement efforts, teachers have not always been considered an integral part of the data use process (Wayman, Midgley, & Stringfield, 2006). Too often systemic change takes root in a school without providing essential structures to ensure success. One of the foundational components to enhancing the likelihood of successful systemic change is having all personnel involved in collaboratively integrating DBDM into their school culture. An additional crucial practice is to ensure that all personnel have a common understanding of key terms and concepts. Unfortunately, this understanding appears to be erroneously assumed but not actually practiced.

An essential early step in promoting the data literacy and collaborative culture necessary for successful implementation of the DBDM process is for principals to ensure that all staff members participating have a uniform understanding of the terminology utilized. The exploratory study described below investigated the development of a process designed to assist principals in accomplishing this vital task. The target population for the study was four elementary schools located in a Mid-Atlantic state. The results were then shared with school leadership faculty from higher education institutions for constructive critique and refinement of

the process. The final results and recommendations are presented after the review of salient literature below.

Data Based Decision Making

The literature contains some variance in the nomenclature used for the process of using data to make and evaluate decisions. Two well-known terms are Data-*Based* Decision-Making and Data-*Driven* Decision-Making (i.e. *basing* decisions on data rather than data *driving* decisions). The terms will be used interchangeably throughout the manuscript, honoring the originators of the terms and processes.

In the climate of high stakes tests and state-mandated standards, there is an increase of federal, state and local demand for educators at all levels to be effective data-based decision makers. While the use of the term "data-driven" has increased notably, just what is meant by data-driven is not widely understood or agreed upon in practice. Data-based decision making is more that an accountability tool, it is a diagnostic tool that fosters the tailoring of instruction to student needs. One of the assumptions about data-driven decision making is that the use of formative assessment designs will lead to tailored improvements over time in content and teaching practices at the classroom level.

Types of Data

Inherent in effective employment of DBDM is the use of data from multiple sources (Love, 2004). Bernhardt (2004) observed, "if staffs want to know if the school is achieving its purpose and how to continually improve all aspects of the school, multiple measures – gathered from varying points of view – must be used" (p. 20). While there is not uniform agreement on ways to sort or group data, use of the following four categories enjoys considerable support in the literature: Demographics; Perceptions; Student Learning (also referred to as Student

Achievement); and School Processes (also referred to as Instructional). Shared understanding of these terms and categories for all staff involved is an important foundational step for implementation of the Data-Based Decision-Making process. Bernhardt (2004) describes them:

- *Demographic* data provide descriptive information about the school community such as enrollment, attendance, grade level, ethnicity, gender, and native language… Demographic data assist us in understanding the results of all parts of our educational system through the disaggregation of other measures by demographic variables (p. 23).

- *Perceptions* data help us understand what students, parents, staff, and others think about the learning environment... Perceptions are important since people act in congruence with what they believe, perceive, or think about different topics (pp. 22-23).

- *Student Learning* describes the outcomes of our educational system in terms of standardized test results, grade point averages, standardized assessments, and authentic assessments (p. 23).

- *School Processes* refer to the educational and psychological events at the school and classroom level; i.e., the way schools "do" business…teachers need to think about what they ask students to do, and how these requests align with the purpose and vision of the school. Administrators need to think about how the system is set-up for success. School processes are what administrators and teachers do to achieve that purpose – the vision (pp. 136-137).

Data-Based Decision-Making Processes

Principals seeking to implement a DBDM process have several options in terms of available models. To illustrate the DBDM process, the following are summaries of model components excerpted from a few of the many DBDM models found in the literature:

- Halverson, Grigg, Prichett, and Thomas' (2007) *Data-Driven Instructional System* (DDIS) is designed for principals seeking to serve in the capacity of instructional leaders; integral components include: Data Acquisition; Data Reflection; Program Alignment; Program Design; Formative Feedback; and Test Preparation.

- Blink's (2007) *Data-Driven Instructional System* uses goal setting as a central theme surrounded by: Data Collection; Data Reflection; Data Translation; Data-Driven Instructional Design; Design Feedback; and Summative Formative Assessment.
- Preuss (2007), who views DBDM as a dynamic process that cannot be confined to a single definitive model, offers the following steps in his "generic model" 1. What is the issue at hand? 2. What is the ideal condition? 3. What is the present condition? 4. What is the gap? 5. Is this a priority issue? 6. Develop an "ends focused" goal statement. 7. Search for root cause; 8. Select strategies for improvement; 9. Action plan; and 10. Monitor and evaluate (pp. 12-13).
- The Mid-continent Research for Education and Learning (Mid-continent Research for Educational and Learning, 2003) offers a model with three essential elements of *data-driven decision making*: 1. purposeful data collection and analysis; 2. Designated resources and other supports, such as time and an appropriate data management system; and 3. Strategies for communicating about the process of data collection and use as well as the findings (p. 1).
- Poynton & Carey (2006) attempted to synthesize several of the extant models and developed their IDEAS model: Identify a question; Develop a plan; Execute the plan; Answer your question; Share Results.

While the models exhibit both similarities and differences, all of them appear to overlook the need to conduct a base-line assessment of school personnel's understanding of DBDM. It would seem to be essential that principals ensure that all staff involved has a common

understanding of the essential components to DBDM. If this knowledge is assumed but not verified, it may cause serious and unintended negative consequences to the process.

Barriers to Effective DBDM

"The barriers to constructive, regular use of student assessment data to improve instruction can seem insurmountable" (Boudett, City, & Murnane, 2006, p. 53). In addition to the lack of common understanding of key terms, the number of models available can serve as a barrier to success, especially if educators have been exposed to several and are unsure of which one is being implemented. While locating models may be easy, implementation is not. Additional barriers to execute an effective DBDM process in a school include a factor identified by Kowalski, Lasley, and Mahoney (2008), "unfortunately, too many educators are afraid of data. They are afraid of what they might reveal, what they might not understand, or, worst yet, what they might mean once they have a better knowledge of what exists" (p. 121).

Many educators have the desire to use data to make informed decisions, but "few educators have the preparatory background to engage in such analysis and reflection" (Wayman, Midgley, & Stringfield, 2006, p. 189). Teachers have training as content-specialists, rather than how to use data to make instructional decisions (Bernhardt, 2004). Wayman, Cho, and Johnston (2007) in their evaluation of data use in the Natrona County School District found teachers claimed to use data, but "they were consistently vague about actions taken from using these data" (p. 24).

Wayman, Midgley, and Stringfield (2006) also identify the sometimes cumbersome data storage systems as a hindrance to DBDM. These systems are often controlled by a few and access is limited. They point out that "the data are often stored in ways that frustrate flexible analyses, and lack of preparation places undue pressure and burden" (p. 192) on educators.

Bernhardt (2004) notes that training on the use of the databases and the data in the system are often inadequate. Additionally, according to Bernhardt, the systems storing the data are frequently outdated.

Bernhardt (2004) further cites the following as barriers to using data:

- In contrast to the work culture in business, the work culture in education usually does not focus on data.
- Administrators and teachers do not see gathering and analyzing data as part of their jobs.
- There is a lack of professional development for teachers to understand why data are important and how data can make a difference in their teaching.
- Some teachers see data as another thing that takes away from teaching.
- Busy school personnel may view data collecting as just more work to do.
- Data are not used systemically from the state to the regional and local levels, nor are they used particularly well.
- School personnel have had only negative experiences with data.
- There is a perception that data are collected for someone else's purposes.
- Data have been used in negative ways in the past.
- There is confusion upon which data to focus (pp. 6-7).

The information shared above is intended to raise awareness levels about issues that principals may encounter when attempting to implement a collaborative use DBDM. A recurring theme was the lack of preparation, resources, and experience in the use of data by school personnel. While the study and recommendations presented below do not cure the anxiety or completely remedy the lack of preparation highlighted above, they do hold promise in the key step of ensuring shared meanings and understandings of key concepts and terms. This appears to be a vital foundation for any collaborative undertaking.

Methodology

This study attempted to develop a process to help principals and staff embrace a common understanding of key data-based decision making terminology. The study had two goals: to identify terminology misconceptions among school staff and to develop a process for acquisition of a common DBDM language base. A grounded theory approach (Creswell, 2007) was used. Four elementary schools located in a single school district in a Mid-Atlantic state were purposefully selected (Patton, 1990) to participate in a pilot study of the process. Each of the schools was visited during a one month period during the fall semester. Each school's principal indicated that the staff had received some form of training on use of data for decision making and each principal indicated that use of DBDM was an expectation of all instructional personnel. Importantly, *each* principal believed his/her staff would have a common understanding of the key terms s/he identified due to the use of these terms during faculty meetings on an on-going basis. Table 1 shows the number of participants at each site.

Table 1.
Site Participation

School	Grades	Teacher Participants	Administrator Participants
School A	3-5	14	2
School B	K-5	24	2
School C	K-5	23	2
School D	K-5	27	1

In all but one school, both principals and their assistant principals met with a researcher to identify what each perceived to be the top twenty data-based decision making terms their staff should know and be able to define. Each separate administrator was asked to list their twenty words without consultation with their colleagues. The administrators were then asked to compare lists and to agree upon the top ten terms for which staff knowledge was expected. (Due to the absence of one assistant principal, one of the principals developed the list on her own.)

During a subsequent visit, each school's staff were then given a document with the ten identified terms (See Appendix 1 for the Sense-Making Framework Worksheet) and asked to write down their definitions and/or understandings of the terms. At a later meeting, the term definitions were reviewed with the administrative team and compared to their own definitions. The principals were encouraged to share these results and discuss the definitions with their staff to develop a common understanding of the DBDM language used in their schools.

The process, tools utilized, and results of this study were shared with seven higher education faculty members at the University Council for Educational Administration (UCEA) annual meeting in Alexandria, Virginia in November 2007. The faculty members were a part of an innovative session format where the background of the study, purpose, and findings of the initial study was reviewed with the participants. Six of the participants held faculty positions at higher educational institutions in educational leadership and one participant served in an administrative capacity. The session was taped and analytic notes were taken as a means to track data and discern patterns (Maxwell, 1996). Each of the higher education faculty members participating in the innovative session agreed that ensuring shared understanding is an important yet unaddressed element of extant DBDM models and there was consensus that this step was generally absent in DBDM models with frequent currency in the field. Each also indicated support for the process used with the schools to build shared concepts and DBDM vocabulary.

Findings

The purpose of this project was to develop a sense-making process building leaders can use with their staff to develop a common terminological framework to operate from when using a DBDM model, as well as to identify terminology misconceptions among school staff. Regardless of the model, it is vital that staff have an agreed upon operational base of mutually

understood terminology. The findings demonstrate clearly that, contrary to each of the principal's stated expectations, school personnel did not share the same foundational definitions of their DBDM terms.

Tables 2 to 5 contain the words each staff was asked to define. The number of correct definitions is provided below for the aggregate of each school staff, as are the percentages of correct responses (agreement does not reflect replication of the exact definition, but adhering to the spirit of the administrative expectations of teacher terminology knowledge). Because administrators were permitted to identify the top words germane to their DBDM needs, not all lists contain the same words.

Table 2: School A

Term	Number of Correct Definitions	Percentage of Correct Definitions
Disaggregation	10/14	71%
Standards	6/14	43%
Master	9/14	64%
Data	11/14	79%
Proficient	13/14	93%
Subgroups	0/14	0%
Data-Driven Decisions	9/14	64%
Formative	5/14	35%
Alignment	3/14	21%
Focus	3/14	21%
Total	**69/140**	**49%**

Table 3: School B

Term	Number of Correct Definitions	Percentage of Correct Definitions
Data	23/24	96%
Disaggregation	19/24	79%
Data-Driven Decisions	18/24	75%
Standards	19/24	79%
Master	17/24	71%
Achievement	18/24	75%
Analyze	8/24	33%
Best practices/best strategies	14/24	58%
Proficient	14/24	58%
Differentiation	19/24	79%
Total	**169**	**70%**

Table 4: School C

Term	Number of Correct Definitions	Percentage of Correct Definitions
Proficient	10/23	43%
Focus	21/23	91%
Subgroups	1/23	4%
Alignment	7/23	30%
Differentiation	12/23	52%
Achievement	12/23	52%
Analyze	13/23	57%
Data-Driven Decisions	11/23	48%
Disaggregating	4/23	17%
Data	3/23	13%
Total	**94/230**	**41%**

Table 5: School D

Term	Number of Correct Definitions	Percentage of Correct Definitions
Data	15/270	56%
Disaggregation	13/270	48%
AYP	14/270	52%
Interpreting	25/270	93%
Skewed	7/270	26%
Achievement Gap	18/270	67%
Subgroups	12/270	44%
Accountability	23/270	85%
Range	17/270	63%
Analyze	21/270	78%
Total	**165**/270	**61%**

While each leadership team believed the staff would be able to easily define the data-based decision making words they generated, the results of the survey demonstrate the opposite. School “B” had the highest percentage of definition agreement, yet only 70% of the staff’s definitions were aligned with the leadership team’s definitions. School D’s staff defined 61% of the terms in a manner consistent with the administration, and Schools A and C’s definitions were aligned for less than 50% of the words. When aggregated, only 56% of the teachers’ definitions for frequently used and important DBDM terms were in agreement with the definitions developed by their leadership teams. While the building leaders had noted these words were often used in conversations, the time was not taken to actually define the words for the staff or to

participate in a process that developed a group understanding of the words they were using. Clearly these results indicate a breakdown in a foundational element of the DBDM process.

These data underscore a lack of assessment literacy both in terms of inconsistent identification by principals and assistant principals of major topics involved in data driven decision making as well as widely varied teacher understanding of those topics from school to school (See Table 6). No discernable pattern among the lists of twenty terms identified by the school leaders in the four schools was found. Of the major topics identified by the school leaders, only two were shared by all four schools. The range of teacher understandings of these terms varied from 0% to 96%, and was inconsistent across the four schools. For example, teachers' understanding of the term *data* ranged dramatically across the four schools from 96% to 13%.

Table 6

School A (N=14)	**School B (N=24)**	**School C (N=23)**	**School D (N=27)**
Data (79%)	Data (96%)	Data (13%)	Data (56%)
Disaggregation (71%)	Disaggregation (79%)	Disaggregating (17%)	Disaggregation (48%)
Data-Driven Decisions (64%)	Data-Driven Decisions (75%)	Data-Driven Decisions (48%)	
Standards (43%)	Standards (79%)		
Proficient (93%)	Proficient (58%)	Proficient (43%)	
Master (64%)	Master (71%)		
Focus (21%)		Focus (91%)	
Subgroups (0%)		Subgroups (4%)	Subgroups (44%)
Alignment (21%)		Alignment (30%)	
	Differentiation (79%)	Differentiation (52%)	
	Achievement (75%)	Achievement (52%)	
	Analyze (33%)	Analyze (57%)	Analyze (78%)

Table 6 (continued)

School A (N=14)	**School B (N=24)**	**School C (N=23)**	**School D (N=27)**
Formative (35%)			
	Best practices/best strategies (58%)		
			Achievement Gap (67%)
			AYP (52%)
			Interpreting (93%)
			Skewed (26%)
			Accountability (85%)
			Range (63%)
Average (49%)	**Average (70%)**	**Average (41%)**	**Average (61%)**

Implications and Conclusions

The value of background knowledge and vocabulary for the academic success of students has been widely publicized in recent years (Marzano, 2004). Ironically, this knowledge and vocabulary component was incorrectly assumed with school staff regarding key DBDM terms. The results of this pilot study surprised the building leaders, as they believed their school staff tacitly understood the words they were using to help lead their students to academic success. If only 56% of the key terms being used are understood by faculty, then a large percentage of information is being misinterpreted and misunderstood, leading to potential breakdowns in the DBDM system.

While simple in nature, this research has revealed underlying complexities to current DBDM structures. Each of the models identified in this manuscript are valuable to use with staff, but clearly there must be an integration of a process that will help staff understand the basic

foundational components. A full description of the recommended process based on the results of this study is provided in Appendix 2.

This study has implications for school personnel and higher education institutions preparing educational leaders. Principals should conduct a data audit of staff to determine their baseline knowledge of DBDM. This can serve as a guide to building leaders as they identify the DBDM model that best suits the needs of school staff, as well as any potential gaps in knowledge that must be addressed prior to the actual implementation of the chosen model. The sense-making process (Appendix 2) provided in this manuscript is offered as one potential vehicle to guide the auditing process.

The results of the sense-making process can also serve as a powerful conversation piece to address other barriers to a successful DBDM process. As identified earlier in this manuscript, there are numerous barriers to the effective use of data. The impediments to the process must be identified and addressed in order to ensure the achievement needs of students are being adequately addressed.

Leadership preparation programs can use the findings to address DBDM in their courses. Not only should a variety of models be explored with the aspiring leaders, but they should have the opportunity to use these models in authentic experiences such as role-playing and case study activities. Additionally, the courses should provide students with tools to conduct data audits on school faculty to discern DBDM concerns and address DBDM foundational deficits, including those in shared understanding of key terms. The leadership students need to be required to demonstrate their use and application of the models and the foundational processes (as suggested in this manuscript with the use of the data sense-making process) in their internship experiences.

It is well documented in the classroom assessment literature that formative assessment can raise standards of achievement (Black & Williams, 1998). Data-driven, or evidence decision making has become the proposed vehicle by which educators will use formative data. Because of this, significant investments need to be made in developing educators' assessment literacy. Fullan (2001) has argued that eliminating the achievement gap will require the mobilization of the teacher workforce around assessment literacy. Today, that literacy means successfully transitioning from a primary focus on summative assessment to an emphasis on both summative and formative assessment. Heritage, Lee, Chen, and LaTorre (2005) have highlighted the need for "considerable investments" in developing assessment literacy at both the district and classroom level.

DBDM appears to have potential to help develop sound instructional plans and processes that meet the varying needs of all students. This study and the resulting process recommendations (Appendix 2) highlight key small pieces of the complex task involved in implementing successful Data-Based Decision-Making in schools. It is imperative that the basic tenets upon which DBDM is built be specifically addressed and understood both in schools and in preparatory programs for school leaders.

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Appendix 1: Sense-Making Framework Worksheet

Define the following *in your own words:*

Term	Definition

Appendix 2:

The Sense-Making Process

I. The Leadership Team

a. The Leadership Team should consist of, at a minimum, the principal and assistant principal(s). It is recommended that individuals who are directly involved with the facilitation of the DBDM process be a part of the Leadership Team.

b. Each member of the Leadership Team should list their top 20 data usage words. These are the words each person believes that the teachers in the school should be very familiar with and be able to define. These words are the "high frequency" DBDM words used in the school with staff.

c. The Leadership Team must agree upon a uniform definition of each word. This process can provide valuable insight into the foundational underpinnings of the use of data in schools. If there are discrepancies in the definitions, these should be explored and discussed and consensus about definitions should be reached prior to completing the process and surveying the school staff.

II. Surveying the Staff

a. Using the format in Appendix A, ask the school staff to provide their own definitions of the top 20 data words chosen by the leadership team (above). If the Leadership Team is constrained for time, a reduced number of words can be used (10 or 15). It is recommended this be conducted in a setting where all staff is present. If this is not possible, then a convenient process should be developed to survey the staff. A member of the Leadership Team should supervise this process.

b. The Leadership Team should carefully tabulate the results of the survey and discuss any discrepancies in term definitions. Salient components/issues arising from the examination of the results should be identified.

c. The results of the tabulation and key issues should be shared with the school staff and discussed. This process can be conducted in a large or small group setting, depending upon the individual needs of the school staff. This conversation is pivotal component of the sense-making process and allows the group to come to a common understanding of the key DBDM terms. Additionally, other underlying potential barriers to DBDM success may arise, that the Leadership Team can also address (either immediately or table it to research and address later on).