The Problem with Data-Driven Decision Making in Education

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Abstract: Data-driven decision making as an extension of test-based accountability policies for educational reform and improvement promises new insights into efficient and effective leadership. An examination of the context surrounding the implementation of this decision making model, particularly relationships of power that serve to enframe the discourse surrounding education, reveal fundamental problems with the implementation of data-driven decision making models. This paper contends that under current contexts the practice at best constitutes a form of illiteracy, and at worst may undermine the public and democratic purposes of education. It is concluded therefore that what is needed in education is not data-driven decision making, but rather principled leadership and a moral framework for the use of information by educators. This leadership should be informed by the application of a logic model for program evaluation, and a democratic discourse led by educators.

Résumé: La prise de décision basée sur les données en tant qu'extension des politiques de responsabilité basées sur des tests pour la réforme et l'amélioration de l'éducation promet de nouvelles perspectives pour un leadership efficace. Un examen du contexte entourant la mise en œuvre de ce modèle de prise de décision, en particulier les relations de pouvoir qui servent à encadrer le discours autour de l'éducation, révèle des problèmes fondamentaux avec la mise en œuvre de modèles de prise de décision basés sur les données. Cet article soutient que dans les contextes actuels, la pratique constitue au mieux une forme d'analphabétisme et, au pire, peut saper les objectifs publics et démocratiques de l'éducation. On conclut donc que ce dont l'éducation a besoin, ce n'est pas une prise de décision fondée sur les données, mais plutôt un leadership fondé sur des principes et un cadre moral pour l'utilisation de l'information par les éducateurs. Ce leadership devrait être éclairé par l'application d'un modèle logique pour l'évaluation des programmes et par un discours démocratique dirigé par des éducateurs.

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Introduction

Data-driven decision making (DDDM) is becoming a central feature of school and district level educational reform or improvement efforts, at least in part as an extension of standardized test-based accountability policies. Many school jurisdictions have incorporated the practice as a goal laid out in an administrative mandate. School based leaders are encouraged to incorporate the practice into school and department goals, as well as teacher professional growth plans. At its core, this trend is at best illiterate and naive and at worst a betrayal of the public purpose of education. Let us start with the option that it is based in a lack of understanding and naivete. The trend seems to imply that the use of data at the heart of decision making is something new and novel. The belief is that by analyzing data we will develop newer and better insights into the realities of teaching and learning that will improve our schools and the achievement of our students. This is a worthy ideal but is based on flawed understandings of what data is and what data matters.

Data-driven decision making is touted as something new, providing greater professional insights. It begs the question, what exactly about this practice is new? In the world of analytic philosophy, data refers to those things which are known or assumed to be true. Whether discovered by observation, reflection or analysis, data is the material that we process at the heart of any decision. Ackoff (1989) identifies data as one part of the content of the human mind. It is the raw material; the facts, symbols, or measurements from which information is derived. Information is data that has been processed to give it meaning through a relational connection (Ackoff, 1989). Information is what we gain from the interpretation of data. Data and information are part of the content of human thought. What has evolved is the systems and technologies to facilitate this thought. The problem with suggesting that DDDM is something new is that rather than seeing the practice as challenging educators to make better decisions it at times belittles and undermines the past decisions of educators as somehow less professional and informed. There is an underlying presumption that the use of information to guide decisions is novel and recent. This is likely the product of the emergence of information technologies and tools for data collection on an unprecedented level. Where data in the past was a component of academic disciplines, data analysis has become a discipline of its own rooted in the use of these technologies. The labelling of the 21st

century as the "information age" implies that we have powers of interpretation that the great minds of education's past lacked. These claims are aimed at securing the exclusive right to control the interpretation of information.

Data and information lay the foundation for the acquisition of knowledge, understanding and wisdom (Akoff, 1989). As such humans have always been information-oriented beings. As a species we are hardly advantaged in terms of physical adaptations to our environment. Our distinguishing evolutionary advantage is culture. We develop systems for the collection, interpretation, and utilization of data to provide us with the means to make sense of and thrive in our world. Language itself is a tool for the production of information from data that facilitates the sharing of knowledge and understanding. Take the oft cited diversity of words for snow used by the Inuit observed by the anthropologist Franz Boas' (Robinson, 2013). The prevalence of words to describe snow is a product of polysynthesis. This uniting of a family of languages allows speakers to encode huge amounts of information into language through the use of suffixes attached to base words (Robinson, 2013). This indicates the evolution of a sophisticated system for interpreting data from the world into information for use by the community. For a community seeking to thrive in a harsh Northern environment the capacity of language to relay detailed information about that environment is critical. Language itself is a central feature of the culture that has allowed humankind to flourish over the centuries. It is a system for codifying and organizing data into a meaningful and useful construct. Humans have always lived in an information age, because we have always been information oriented, "big brained" beings. We have over time evolved more and more advanced systems for the aggregation of data, from the printing press to cloud computing. However, the fundamental underlying reality remains unchanged the process of using data to inform decisions is a fundamental aspect of human thought. As Akoff (1989) indicates, data and information are components of thought not new and novel approaches of any one age.

Speaking to computer scientists in 1990, Neil Postman issued a prescient warning about the use of information. Throughout human history information has been a resource that enables and empowers us to address the "emerging problems of our material and psychic environment" (Postman, 2013). Given the significant value of such a resource, a core political task in human communities has long been the creation of structures to secure and control

information. We create systems that organize information into constructs from which we can service meaning to guide our actions. Data without some architecture to organize, analyze and interpret it is simply an undeveloped raw material. In our so called, "information age" we have such a glut of information as to make it appear simultaneously random and consequently meaningless. Computer science and the field of data analytics has grown lockstep with the explosion of data in our time. It has become the organizing architecture, the political and economic institution, that controls our interpretations of our world and directs our actions. The church of the past provided its followers with a framework for making sense of the randomness of data and the seeming ambivalence of the universe toward the average individual. Today we hand over this same power to the technological masters of data manipulation. The core difference is that past systems for the use of data provided a moral framework (albeit fundamentally flawed) within which decisions were made. Data informed decisions, but the decisions were driven by principles and ideals, not the data itself. Modern data science has important potential to facilitate professional decision making. At the same time big data and data science tend to focus on quantitative data that is easily aggregated for statistical analysis. This carries the potential to have a reductionist impact on qualitative research (Mills, 2018). Educational decisions are fundamentally about the quality of teaching and learning. This requires that educators ask critically informed questions about what data to collect, curate and interpret. Aggregated test results are one of the most common sources of information for decision making within education, but this has value only insofar as it corelates to meaningful evidence of student learning and fulfilment.

Today, our definition of data is one grounded in a technocratic understanding of decision making. It is a reference to particular types of knowledge, discovered or assumed, that are grounded in statistics, or accessible to computer-based processing, for the purpose of reference and analysis. This later definition leads into concerns about the undermining of our public purpose as educators. In Walden Henry David Thoreau wrote, "Our inventions are wont to be pretty toys, which distract our attention from serious things. They are but improved means to an unimproved end." The fundamental problem with DDDM in its current form is that we have no organizing framework within which to ground our decisions, or at least not one that is any better than those of the past. Improvements in information systems, whether the printing press or digital media, have made the transmission of information

more efficient, but our interpretative frameworks have not kept pace or improved. As a result, what has been fostered as a norm is the passive reception of information. Both the laity and professionals have come to see the acquisition of information and not critical judgment of information as an aim.

DDDM as a Vehicle for the Subjugation of Education to External Influences

The data we primarily use for the evaluation of educational programs is drawn from standardized achievement tests. This practice is rooted in the accountability model of education, what Hargreaves and Shirley (2009) label the "second way." This is the path of standardization and external accountability. This is a technocratic model for education that becomes over reliant on data, sometimes in ways that inhibits rather than informs effective adjustments to teaching practice (Hargreaves and Shirley, 2009). This approach is at best a self-fulfilling prophecy and at worst a hindrance to the public good. This approach is grounded in the essentialism associated with authoritarian aims for education. This authoritarianism has been a constant from the protestant school goals of Martin Luther, to the neo-liberal transactionalism of the industrial school model. To assess students on the retention of prescribed information is indoctrination not education. The denial of agency for students in the determination of the content of study is fundamentally undemocratic. Yet, even by its own stated aims the accountability model is a poor enterprise. We have effectively transposed a model for business sales performance to human development; the origins of DDDM are in business analytics (Provost & Fawcett, 2013; Saltman & Means, 2017). These are not analogous enterprises. Students are not purchasing customers, and the "client" of public education is not an individual, but a community writ large. There are not traceable transactions, so we seek data that fits this paradigm. Data that is easily aggregated and can be connected to an individual receiving service. Standardized achievement test results are readily aggregated, but this aggregation provides little insight into the impact education has on the leaner or the broader community.

The problem with this equivocation is that standardized achievement tests are not designed for instructional sensitivity and provide little if any insight into the reality of teaching and learning (Chatterji, 2013a; Chatterji, 2013b; Ing, 2018; Polikoff, 2010; Popham et al., 2014; Popham, 1999;). Even if these assessments did

correlate meaningfully to instruction, the insights would be limited by the fact that data literacy is frequently an underdeveloped skill set amongst educators. Little attention is given to the development of data literacy in teacher preparation programs (Bocala & Boudet, 2015; Mandinach, Friedman & Gummer, 2015). In service professional development around data literacy is also in need of improvement (Schildkamp, Karbautzki, & Vanhoof, 2014). Teachers' decision making is largely intuitively based (Vanlommel et al., 2017). This is in part an expression of the expertise developed through practice, particularly the humanistic elements of pedagogy. It is also a product of the lack of data literacy among educators. As a result, the capacity to interpret the data from standardized assessments as well as formative assessments is limited, absent education, or outsourced in education. The first two of these possibilities result in ill-informed judgments, the last hands over the direction of education to those without a pedagogical relationship to the students. This diminishes the possibility of effective interventions by teachers, as well as perpetuates the problem of limited data literacy amongst educators. Each of these possibilities negates the likelihood that a public education system can effectively serve a public purpose. The result is that we focus on the data that is easiest to acquire and assemble (often assembled for educators by psychometricians). This is the famous "street light effect." The parable of the drunk looking for his wallet under the streetlight rather than where he lost it because, "this is where the light is." If the goal of DDDM is school improvement, we must ask what data we need. This begins with answering questions about the aim and purpose of education.

As we focus on testing and test-based data, we construct educational experiences aimed at tests. Schools produce above all else competent test takers, but a life of tests, may not be the best preparation for the tests of life. Education as an institution has no clear teleology. Without a clear purpose or set of principles to guide our decisions, what we choose to measure becomes what we value. This is a perverse inversion of informed practice. We have embraced a model for metrics and decision making designed for a context of transactional exchange. We have allowed the masters of finance to determine the discourse that shapes teaching and learning. We run a public service, education, as though it is a business, without asking if the business model applies.

The intrusion of the transactional world view into education is analogous to colonial rule. A subjugation of the educational narrative to the interests of "success, money and competition"

(d'Agnese, 2015). This is not a nationalist colonialism, but the replacement of the locally defined and democratic functions of education with the narrative of neo-liberal globalization. Under this construct commercial economic interests become the definition of educational success through internationally normalized approaches to standardization like the Programme for International Student Assessment (d'Agnese, 2015). Focusing DDDM predominantly on achievement testing effectively eliminates conceptions of the world that are not consistent with the narrative of profit driven transactional exchange. This diminishes any function for education that is not about the readiness for employment based on corporate interests. The acceptance of this framework may serve the interests of the interlocutor, but potentially at the expense of the best interests of the community. Particularly localized aspects of identity, representation, and governance.

In the American context, the imposition of corporate hegemony over educational policy is a clear imposition, particularly through technology companies, and the not-for-profit foundations of major corporations such as the Gates Foundation, Board Foundation and Carnegie Foundation (Saltman & Means, 2017). Globally, this is not an intentional colonialism, at least not on a consciously grand scale. Instead, it is an effect of the interpretive architecture and the utilization of data. Certainly, the American reality has had a global influence by embedding the technocratic approach to administration within programs for educational leadership. The technocratic approach to education acts to "enframe" our discourse (Heidegger, 1977). The system of interpretation we utilize to organize information into a meaningful construct comes to define the "essence" of education. Those influencing education from positions external to the education system, not well versed in pedagogy, impose a "willful illiteracy" (Saul, 1993, 111). The exclusion of teachers from curriculum development in Alberta is a clear example of this concern (Ferguson, 2020). True literacy is about the construction of a shared cultural experience, not the creation of exclusive dialects to which the vast majority have no access. These stakeholders, much as colonial powers of history, may well believe that they are acting in the best interests of those upon whom they are imposing. Theirs is a narrow view of education that overemphasizes the rational at the expense of the humanist influences on the development of advanced societies. This myopic vision of educational practice and purpose imposes a reductionist evaluation and measurement framework. By naively adopting the tools of interpretation from technocratic and commercial sources

educators hand over the very form and meaning of education to those outside of pedagogical practice and outside of the democratic and public purpose of education. John Dewey (1916/1997) cautioned against these types of impositions on education in *Democracy and Education*:

> The vice of externally imposed ends has deep roots. Teachers receive them from superior authorities; these authorities accept them from what is current in the community. The teachers impose them upon children. As a first consequence, the intelligence of the teacher is not free; it is confined to receiving the aims laid down from above. Too rarely is the individual so free from the authoritative corporate supervisor, textbook on methods, pre-scribed course of study, etc., that he can let his mind come to close quarters with the pupil's mind and the subject matter (108-109).

These "aims laid down from above" are palpable in the technology driven corporate model of public education. This paradigm conceptualizes students and teachers as existing only within the context of market exchange. Thus, relegating the student to the status of a consumer who engages with educational material only for the purpose of obtaining some thing (Attick & Boyles, 2016). Notions of individual emotional or intellectual development are set aside, as is the ideal that the activities of students and teachers contribute to the formation of a democratic citizenry.

The infiltration of education by a business ethos is not new. At the start of the last century the adoption of Taylorist models of administration had a profound effect on education. Two important and lasting consequences of this were the emergence of a "cult of efficiency" that replaced questions of education and human development with business imperatives and the pursuit of efficiency (Callahan, 1962). The separation of educational goals from administrative goals was normalized and legitimized in this process (Murphy et al., 2016). Taylorism served to deprofessionalize teaching and to disempower educators through a process of standardization (Saltman & Means, 2017). It has only been in the latter 20th and early 21st century that this Taylorist legacy has been challenged by those seeking to establish "learning-centered leadership" in schools (Murphy et al., 2016). Learning-centered leadership seeks to reconnect the administrative process with educative activities. The prevalence of DDDM approaches is

passively if not actively reestablishing the disconnect and reframing the discussion around business imperatives. DDDM that focuses predominantly on summative assessments encourages a partitioning of teaching into measurable units only loosely associated with the act of student learning; a design not far removed from the time-motion studies of Taylor. This disconnect was powerfully demonstrated in the case of Central Park East Secondary School, where changes in instructional approach increased the enrollment and success students from low-income communities in college, but standardized achievement results at the school showed no significant improvements (Neil, 2003). Too often educational leaders seek the most efficient strategies for achieving outcomes, while asking few if any questions about the outcomes themselves. Current approaches to DDDM push educators to see test scores as outcomes in and off themselves, not as correlates to learning or success. Recognizing the subjugation of students and teachers to interests outside of education (and their decisions to frameworks established outside of education) as a colonial paradigm reveals fundamental flaws in current DDDM efforts.

Educational administrators express a version of what WEB Du Bois (Du Bois, 1903/2008) labelled "double consciousness," a conflict of identity that exists within colonized peoples. The administrator that exists under the market model of public education comes to see themself through the eyes of others. Specifically, administrators see themselves through the eyes of the business community, rather than through the eyes of their own profession. This, as Du Bois pointed out, is a product of the power the dominant majority holds over discourse and identity (Meer, 2019). Often administrators end up looking at data, especially achievement test data, as though being observed by the business community, not educators or the democratic public. This is reflected in the common metaphors for the place of students in education as product, as customer or as client (Mahatmya et al, 2014). The result is a self-imposed powerlessness to shape the discourse that surrounds education. Teachers become effectively disenfranchised as the corporate model is granted hegemony over our discipline.

The separation of administrative decisions from a clear sense of purpose and especially from a sense of shared community and social obligation blinds decisions from long term consequence. Administrators become focused on immediate and reductionist decisions that they fail to see how individual decisions divert from a core purpose, or how decisions aggregate to impair the achievement of higher aims. A valuable example from colonial rule

illustrates the concern. In the city of Delhi, British colonial rulers were disturbed by the presence of venomous snakes. A scheme was set up paying locals for dead cobras. The entrepreneurial population of the city began breeding the snakes, much to the chagrin of the administration. The program was cancelled in response and the snakes, having lost their value, were released upon the city (Bakshi, 2017). This is a telling analogy for educators. The search for expedient forms of measurement based on simple data may compromise the accuracy of program evaluation. We ought to ensure a high-quality education for all students, and the establishment of standards can aid in this process. However, standardization is not the same as quality of educational experience. We may be counting cobras and be ignoring the second order effects of our measurement choices. Jennings & Bearak (2014) provide a clear demonstration of this concern. Under the "No Child Left Behind" (NCLB) program important state standards were excluded from instruction as teachers altered their practices to focus on predictably tested skills. The choices made regarding measurement directed instruction away from elements of the intended curriculum (Jennings & Bearak, 2014). A phenomenon now broadly referred to as teaching to the test, a practice that reduces the depth of instruction and narrows the curriculum (Volante, 2004). Popham (2001) indicates that an important part of mitigating this effect of standardized, or high stakes, testing is "curriculum teaching." Curriculum teaching focuses on test represented content rather than specific test items (Popham, 2001). Sound teaching leads to improved student achievement. Unfortunately, when teachers are aware that examinations focus on some content to the near exclusion of others, it directs instruction accordingly. More importantly these are often measurement tools imposed by political interlocutors and economic stakeholders not educators. The evolution of diploma examinations in the province of Alberta is a clear demonstration of this interlocution. Efforts of the governing Progressive Conservative Party, beginning under Premier Ralph Klein in the 1990s, to apply free market solutions to the education system led to the broad use of publicly reported achievement test results to create an environment of competition. The result was to confer a legitimacy to test results independent of the validity of testing itself (Graham & Neu, 2004). This framework remains in place today. Test achievement results are meant to be indicators of attainment, not an aspiration in and of themselves. However, when part of a political agenda, results become an aim in and of themselves regardless of how they are achieved. This is particularly true if

results are tied to school funding. The now infamous Atlanta schools cheating scandal is a powerful demonstration of this effect. The perceived need to attain scores on testing at the school level led to cheating by educators at the school and district levels (Aronson et al, 2016). This left schools and students in need underserved as a result of a measurement program intended to raise levels of achievement.

This "cobra effect," is a demonstration of "Goodhart's Law." Named for the economist who observed the unintended consequences of measurements used in monetary policy. Goodhart's observation was that when a measure becomes a target it ceases to be a good measure because it distorts the activities being assessed. This should be a central concern for educational leaders. Without a clear understanding of the purpose and aims of education we risk setting ill-informed policy and using measurements that direct teachers and students toward counterproductive pursuits. The accountability model of education is a paradigm of misguided data use. The most important information regarding the learning process is to be found at the process level where students and teachers are in the act of teaching and learning. It is here that insights from assessments can be applied to timely intervention that will most impact student learning (Hattie & Timperley, 2007). The seminal work of Black and William (1998) heightened awareness among educators about the importance of formative assessment. Research through the Organization for Economic Cooperation and Development (OECD) has established a distinct need for improved models of formative assessment to promote student success (Dumont et al, 2010). There is widespread recognition of the need for a more effective assessment paradigm that involves a shift away from "assessment-for-accountability" toward a culture of "assessment-for-learning" (McFadden et al, 2014). There is substantial institutional resistance to this shift and the pressures to preserve "business as usual" and the realities of institutional culture and behavior are still defined by the accountability model (McFadden et al, 2014). Teachers and schools often respond to assessment data in ways that undermine the very performance that we are attempting to measure (O'Neill, 2013). This is in part because institutional structures still direct a majority of attention of data informed practices toward the lagging indicator that is achievement test results. As McFadden et al (2014) indicate this is a question of institutional culture and political context. As educational leaders move to DDDM it is important to ask critical questions about the purpose of education, especially the public

purpose of education. Our eagerness to embrace the models of program evaluation from private sector paradigms risks leading us astray.

Program Evaluation from DDDM to a Broader Logic Model

There is significant value in the use of data within an analytical framework for the improvement of practice. Ultimately this is an element of any modern profession. The use of data must however occur within a broader framework of program evaluation and professional practice. Before educators engage in DDDM a broader understanding of program evaluation is required. One useful framework may be the application of a logic model. Anchoring our use of data in such a framework will require educators to determine what data we need, and to seek out appropriate data sources. This will require educators to link their generally intuitive practice to sources of information that can inform, validate, or correct errors, in these intuitions.

A logic model is plausible means to determine how a program is working under specific environmental conditions (Wholey et al., 2004). This later part is an important caveat. The cultural, political, and economic context of an educational program are significant. Localized decisions are an important factor in the success of educational change initiatives and what works in one jurisdiction may not effectively transfer to another without localized leadership and refinement (Fullan, 2007). Successful use of data to inform practice must include the development of professional capacity at the local level, particularly among practitioners (teachers). Data literacy skills must be developed in educators to facilitate this process. The engagement of practicing professionals in program design and program evaluation specific to localized contexts must be part of this process. Engaging teachers in the design and evaluation process will promote the development of professional capacity. Engaging teachers in the sharing of practice through professional learning communities (PLCs) has been shown to increase professional efficacy (Voelkel & Chrispeels, 2017). This type of professional development would be an excellent platform through which to foster data literacy.

A logic model has four key features: inputs (resources), activities, outputs, and outcomes (impacts) (Wholey et al., 2004, 9). In public education systems our inputs are largely determined by the budgeting process of respective governments, and

notwithstanding the impact of advocacy by educators, largely outside the control of educational leaders. In an age of renewed austerity for many communities, educational leaders must be able to connect the resources in terms of public spending to other elements of the logic model. The "commercial mindset" is a source of many mistaken ideas in education policy (Abrams, 2016). The most notable mistake is that at times educators import the production process of businesses to the process of education. Where in economic production the process from inputs, like capital, to product, like a box of cereal, is linear. When education is viewed as a linear process with the product being the educated student it ignores the complexity of the educational process. As well as the reality that that same individual is simultaneously an input and an output in the process. It also flagrantly denies the humanity of the student. This mindset however dominates the thinking of many governments, particularly those engaging in fiscal austerity. Education spending is largely perceived as discretionary as opposed to mandatory spending. In the absence of an increase in taxation, it is likely that governments will cut public expenditures in discretionary areas (Streeck & Mertens, 2011). This is not to suggest that increased spending alone will improve education. The important fact is the observation that educational systems will have to work with greater limitations on resources. As the benefits of investment in education are long term, and the costs immediate, political systems tend to be biased against expenditures in education (Dickens et al., 2006). If effective public education systems are to be sustained, educational leaders at the district and system levels need to be able to connect these resources to outcomes. By illustrating the economic advantages produced by the development of human capital educational leaders can lay claim to the necessary resources for the preservation of public education systems. This is particularly true for jurisdictions that are economically dependent upon resource revenues where this dependency can crowd out the accumulation of human capital and lead to lower economic growth, the so called "resource curse" (Sun et al., 2018). This applies both to expenditures on public education systems directly, as well as expenditures on teacher preparation programs, and on professional development like the support of PLCs. As teacher quality is a key determinant of student success (Darling-Hammond, 2000; Hattie, 2003). The long-term survival of public education depends upon the ability of educational leaders to use data regarding the impact of education on the formation of human capital constructively as a tool for advocacy.

Activities, which under the logic model refers to the things done within the program being evaluated, are an area of significant potential influence for educators. This includes the learning tasks, the form of instruction, and the interactions between teachers and learners. The activities that take place in school will be largely determined by the measurements we select. This is the lesson of Goodhart's Law. For educators to claim professionalism, and to assert some level of influence in a broader political discourse that surrounds education, the activities that we engage students in must correlate meaningfully to the impacts of education writ large. This requires that educators have a clearly articulated sense of purpose. Activities must be evaluated in relation to both short term data related to the effectiveness of activities themselves, such as classroom formative assessment and student engagement, as well as long term impacts. Engaging teachers in collaboration and establishing correlations between activities and outputs is a tool for building this professionalism. The famous success of the Center for Performance Assessment in raising student achievement efforts in "90/90/90 Schools" is a clear demonstration of the power of engaging teachers in identifying the activities, or practices, that promote success (Reeves, 2003 & Kearney et al, 2012). Collaboration in 90/90/90 schools ensured that standards were not only set, but that an ongoing process of professional collaboration to link outcomes (test results) to the activities in schools was established. This both identified practices that were promoting success in reaching standards and built professional capacity in these schools.

This study is also a clear demonstration of the caveats to data use being discussed here. On the surface the study which identified schools in which 90% of students qualified for free or reduced lunch, 90% or more of students are from ethnic minorities, and 90% or more of students achieved high academic standards (Reeves, 2003). The first two of these criteria are inputs. The eligibility for reduced lunch is data that indicates students from low-income families. Like low income, a minority ethnic background in the US is strongly correlated to lower academic achievement (Reeves, 2003). The outcome used was student scores on a standardized exam. The success of the program stemmed from avoiding a linearity from input to product by using formative assessment practices to support interventions and the development of improved practices. The 90/90/90 phenomenon though has been challenged by critics, Baeder (2011) goes so far as to call the phenomenon a "myth". The measurement tool largely used to indicate "high achievement" was the Wisconsin Reading Comprehension Test (WRCT), a test that

83% of schools in the study area already met (Baeder, 2011). The state uses the test as an indicator of "basic" achievement, not "high" achievement (Baeder, 2011). The success in raising student achievement for students at a disadvantage is still respectable. The larger issue is that there is little information available on the longitudinal impact of these programs on the students, such as post-secondary success, social mobility, or transition into employment. In short it is not established that these programs changed the lives of students. This is not to say that it has not, but it illustrates this common blind spot in our use of data to inform educational decision making that can be addressed through the logic model.

The outputs we typically measure are indicators attached to activities, such as reading test scores or high school completion rates. Often, these measures suffer from a decontextualization. High school completion rates, or standardized achievement test scores are only of value if this data can be correlated to the long-term objectives of education itself. Completion of schooling by those in mandatory public education systems ought to be a foregone conclusion. The fact that it is not is revealing. The data itself does not reveal anything other than a problem within the program. If it leads to questions about how to increase completion, without an analysis of inputs, activities, and outcomes the resulting policies are likely to be expressions of the cobra effect. This is where the incorporation of formative assessment data becomes critical. It provides insights into activities in a manner which allows for timely intervention and adjustments to the activities or practices to promote improved outcomes. Likewise, if achievement test results become an end in themselves, rather than a data source to be connected to the other elements of program evaluation the results will be activities that diminish the likelihood of achieving long-term impacts and increase the likelihood of ill-informed activities in schools.

Outputs are fundamentally an interim indicator of the connection between activities and impacts. Localized professional capacity is the best means by which to guard against activities that deviate from intended outcomes. The primary focus of any logic model should be the impact (outcomes) of the program. Any functioning logic model must begin from a clear articulation of intended purpose. Once these are identified, we can begin to intelligently determine what and how to measure to inform our practice. This is the conversation that should be promoted around DDDM in educational contexts. If a goal of a public education system is an expansion of economic opportunity and the expansion

of human capital, effective program evaluation would connect inputs, activities, and outputs to measurements of employment and participation in industry. If a goal is life-long learning, then program evaluation would require specific information about students' participation in postsecondary, employment based, and community education programs at latter stages in life. If the goal of an education system is the formation of an active and engaged citizenry, then data related to civic engagement would be correlated to educational programs. Furthermore, this work must be done by practicing educators to ensure professionalism, program quality, and the integrity of public education systems.

Conclusion

The essence of a thing does not need to be permanent. In fact, as Heidegger (1977) suggests, we can initiate and participate in the process of enframing. In democratic communities specifying the aims, and essence, of education requires a public discourse. This discourse should be informed and led by educators as experts in the tools of pedagogy that will ultimately turn these aims into activities and direct resources effectively toward outcomes. If this process is not conscious and intentional then the nature of education will be determined by a continued professional colonialism that deprofessionalizes and disempowers teachers. It is not the goal of this paper to define the aims of education, but to illustrate that informed educational leadership, and so called DDDM, is not possible until the aims are clearly articulated. If our aims are multiple, as modern education's most influential thinker, John Dewey (1916/1997), rightly suggested they ought to be, this process carries significant complexity. We might summarize our aims into two broad categories: the development of the individual, and our public purpose. The first category centers on the maximization of individual potentialities. The second includes aspects of the formation of a democratic citizenry and the maximization of our collective potential. In relation to the first we often talk about our activities promoting lifelong learning. If this is our intended outcome, we ought to be identifying measurements of future learning by our students (post-secondary success, or engagement in career-based learning), as well as identifying measures of engagement and motivation for learning in current programs. In relation to the second, data related to civic engagement and the

state of democracy in our communities is needed, as well as the current views of students on these matters. In both cases this type of data cannot be found in achievement test results. We need measures of authentic academic achievement (Newmann et al., 1996), the development of the skills and dispositions that reflect the work of experts. These will direct us to engage students in activities that have value beyond the walls of the school. Effective program evaluation starts with identifying a clear purpose, and then collecting the relevant data. If educators are not the ones to identify the data needed based on a social and democratic discourse, then the aims of education will be imposed on schools by those with a private interest. Under such a framework the link between democracy and education, as well as the creation of an equitable starting place for all members of our society will be lost. The problem with DDDM is that it emphasizes the wrong component of human thought. This emphasis carries the risk of leading educators to make myopic or misguided decisions that ignore the humanity at the foundation of our undertakings, and the larger society which education should play a key role in shaping. Educational decisions should be driven by a clear sense of moral purpose and informed by the intelligent and strategic use of data.

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