

*Data, Data Everywhere (And We Don't Know What To Do):
Using Data for Wise Decisions in Schools*

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Lorna M. Earl, Ph.D.



International Centre for Educational Change



**The Ontario Institute for Studies in Education of
the University of Toronto**

October 26 -- Janet Chalmers, the principal of H. C. Andersen elementary school is sitting at her desk looking worried. A mountain of paper sits in front of her. She just stares. What is she going to do? She rereads the memo from her superintendent.

As part of our accountability strategy, each principal will use the attached electronic template to produce a report card for the school. The report card should detail the school's accomplishments, difficulties and action plans. These report cards should be evidence-based, drawing on system-wide and local data. The completed document should be sent to the Superintendent's office for review no later than January 20th. A final district document will be published in the spring for public distribution.

Janet is distraught. She agrees that schools need to be accountable. But, she isn't sure that she has the knowledge, the skills or the resources to create a school report card that would really tell anyone about this school. And they want it to be evidence-based, whatever that means. Presumably that means using data, but what data should she use. Sure, she has the results from the provincial tests, and they surveyed the parents before they decided about the new playground equipment, and she could probably get some statistics about something or other from the district office. But that won't tell much about H. C. Anderson. Somehow, it just doesn't feel right.

Principals, all over the world, are facing the same dilemma as Janet. They have a new set of responsibilities in their role description – evidence-based reporting to show that they are accountable. And many of them, like Janet, have no idea what to do, or even why they are doing it. They feel uneasy and hope that someone in the organisation, or the government, or somewhere do have a clearer picture.

Working with, thinking about and using data has become a routine part of the way many sectors in contemporary cultures operate. This is a relatively new phenomenon in education, however. It has arrived quickly and the consequences of decisions made in educational environments are high-stakes for the children. Educational decisions based on using data will have far-reaching impact on how the children of today will construct the future. But using data in education is not simple. As Harvey Goldstein, an eminent statistician in England told a legislative committee of the British Parliament in 1993:

It is important to avoid the trap of supposing that the provision of some information about schools is better than no information at all. At the very least, if such information is published, we should insist upon the normal canons of scientific evidence and social integrity.

His challenge remains true today. Those who produce, require, communicate and use the data have technical and social responsibilities. Educators certainly have a major responsibility but so do politicians, lobbyists, interest groups, the media, bureaucrats, statisticians, real estate agents, parents, and the list goes on. As I have argued elsewhere, “We live in a culture that has come to value and depend on statistical information to inform our decisions. At the same time, we are likely to misunderstand and misuse those statistics because we are “statistically illiterate” and consequently have no idea what the numbers mean”(Earl, 1995). In this paper:

- I argue that data can and should be part of decision-making in education but that wise use is essential and that using data wisely is an art;
- I examine the responsibility of groups like politicians, lobbyists, interest groups, the media, bureaucrats, statisticians who promote

and foster the use of data in educational decision-making to ensure their wise use; and

- I put forward some challenges to these groups about the measures that are being taken to use data effectively and honestly in the pursuit of ongoing school improvement.

Urgency, Energy, Agency, (Synergy) and More Energy

In an ongoing evaluation of the Manitoba School Improvement Program, we have identified a cycle of change that moved from urgency to energy to agency and to more energy (Earl and Lee, 1998). In this cycle, something prompts a sense of urgency about changing the way of doing business. This urgency is experienced as a surge of energy – largely free-floating anxiety that we found could result in productive action or tumble into despair. When there was a feeling of agency (i.e., the conditions were right and the capacity for action was in place or accessible), these bursts of energy led to an upward spiral with an increased sense of confidence and productivity. This, in time, released more energy and the cycle went on. When the conditions thwarted action or there was no organisational capacity to deal with the change, the energy spiralled downward into anger and disillusionment. We have since added synergy as another dimension to this cycle because shared actions appear to move the whole change initiative beyond its original intentions to new levels of action.

This cyclic model of change is very useful for thinking about how educational institutions respond to using data, as a major change in the way they are expected to operate. What is the urgency for the use of data? Where is it coming from? Has it launched a surge of energy? Is the energy positive or negative? Do educators feel a sense of agency? What do they need to feel confident and competent about using data? What can governments, districts, universities, etc., do to promote synergy?

The Urgency

Over the past few decades, the urgency to attend to data in education has increased dramatically. There was a time when the only evidence required for making decisions in schools was the best judgement of the principal (sometimes in conjunction with superintendents and trustees). That time has long passed. The public has come to expect that nations, states, provinces, districts and schools are able to answer questions like: “How well are you doing?” “What has changed?” and “How are you addressing the issues?” not with stories or vague allusions to “Trust us, we’re professionals” but by using data. Educational institutions, increasingly, are being asked to “show” that they are effective or improving or striving.

This interest in data for decision-making comes in part from a culture that is awash in data. The power and availability of computers has moved data from the private purview of a few dedicated statisticians and actuaries to an ordinary part of the culture, available to the masses. Data have become a major part of daily living, from the TSE to results from political polling to nightclubs swiping driver’s licenses for identification and for marketing. In education, this means that countries, states, provinces, districts and schools are accumulating massive amounts of data, storing them in electronic form and using them (or not) to inform political and operational decisions.

A logical corollary of having more data is that the data will become part of the broader base of knowledge that is available to educators and to the public. And, the public is very interested in receiving data about their schools. Public concern about education has made it a stalwart for the media, with a guaranteed audience. As a media person once told me:

Education is a perfect media topic. It has heat and light. Heat because everybody cares about it and light because they all think that they understand it. If one of those is missing, it's tougher to get their attention.

So, a hungry public that has become used to having information reported as statistics, with graphs and charts, form a willing audience for data about education. This means that many groups and individuals are interested in and willing to analyse the data in a variety of ways and report it publicly. Governments, ministries, districts and other agencies have become involved in using data to communicate with a whole range of stakeholders. For example, in the United States most schools, districts and states produce reports describing their jurisdiction. Education Week magazine and the Council of Chief State School Officers have produced annual reports for several years called “Education Counts” that provide information based on indicators that are available in all 50 states, as well as articles examining the implications of some of this data collection. In England, the government produces many statistical reports for the public and for educators. For example, every primary school as part of their Autumn Package receives a report called the PANDA (Performance and Assessment Report) which provides information for the school on attainment this year and over time, details about cohorts, classes, subgroups with particular characteristics, and schools with similar demographics. The Times Education Supplement in England annually reports league tables based on the number of students getting A-C in A-level exams. School reports that result from OfSTED inspections are posted on a web-site for public viewing. In Canada, provincial, district and school reports are generated in most provinces based on provincial assessments and the Fraser Institute uses data from provincial ministries

to rank schools. This conference attests to the fact that there is an interest in empirical issues in education that extends country-wide, across sectors and across.

The question of whether or not data ought to be collected or available publicly has become mute. It is clear that data will, in fact be accumulated and disclosed and used. The compelling issues are about things like how, when, by whom, and under what conditions. And about the roles and responsibilities that accrue to everyone who has an interest in education to bring wisdom and integrity to the process. The urgency that people like Janet feel is real and it is time to unleash their energy and build their capacity so that they can contribute to the debates with integrity and confidence.

The Energy

The public interest in having and using data may have served as the stimulus to get educators attention. There are few educators who have not shared Janet's concern and the anxiety that she feels about what she is being asked to do. The external pressure for using data may provide the *call to action* that jolts educators into action. When accountability systems are mandated, the data that result from them serve as powerful extrinsic motivation for educators to think about educational change. So, external pressure for accountability may result in temporary engagement with data (often with a focus on damage control), but what will stimulate the kind of intrinsic motivation to consider and use data that goes beyond superficial compliance.

For data to become an embedded part of the decision-making process, its use must be intrinsically motivated. Leaders (and teachers) need to believe that the data can be of benefit to the organisation and that

it is worth the effort. When using data becomes synonymous with organisational improvement, the processes and practices surrounding the use of data are likely to be sustained and refined and become intrinsically entwined with educational decisions.

Right across the country there are pockets of educators who have become aware of the value of using available data and for collecting data on their own. They are discovering that thoughtful use of data can provide a vehicle for examining their schools through various data lenses in making institutional decisions. Data, rather than being irritating demands from “out there”, can be viewed as a necessary part of effective educational change and consequently, a critical part of the work of taking charge of change. This has been particularly obvious in the evaluation of the Manitoba School Improvement process. We have seen a progressive change in attitudes and actions in the improving schools, directly related to using data. In the early stages, the project evaluation requirement that necessitated collecting and reporting evidence in relation to the projects was a tolerated burden. School staff had neither the interest nor the skills to evaluate their progress. In fact, their view of evaluation was often a jaded perception that it would be a statistical exercise that would not do much for them, but was required to satisfy the funders. Over the years, as a result of experience, support and professional development, many of them became quite adept not only at collecting data but also, much more importantly, at thinking about it, interpreting it in context and using it.

This interest in data is also evident in recent interviews with principals in MSIP schools. They were candid about both their interest and their continued discomfort with having and using data.

*We want to see some kind of data,
evidence that would drive our next step.*

We have established a baseline this year. We've got to see some kind of data to drive our next step. We survey every student in the school. This told the staff a lot about their wishes and wants.

All too often, when there is no agency, this kind of energy gets shunted away from the issue and used in avoiding dealing with it. As John MacBeath (2001) found in a study of educational leaders responses to data – they have many mechanisms for avoidance. The principals in his study were provided with data collected from pupils, parents and teachers in the 80 participating schools. The data were ambiguous and there were wide perceptual gaps. MacBeath used Freudian concepts of denial, rationalisation, projection and introjection to describe the responses of principals to the data. Without some mechanism for engaging with the data in productive ways, many principals wished the results away.

If principals in schools don't have agency, the likelihood of them resorting to defensive and protective responses is pretty high. Just exhorting them to use data and saying it louder and more publicly is not likely to increase the organisational capacity.

The Agency

Throughout the past decade, I have been fortunate to have been engaged in research and evaluation studies in a variety of contexts that have afforded us close-up investigation of how educators in different locales are using data. Not all of our observations have been positive. In fact, one of the most distressing findings has been the variability in people's knowledge of what the data mean and how such information might contribute to decisions (Earl et al., 2001). In large part, these

differences appear to be connected to the availability of support in this new and confusing part of their work.

Using assessment results and other indicators of quality has moved education into the world of statistics, an area in which most educators have little experience or training. At some general level, educators know that the value and utility associated with data come from the care with which the information has been collected and collated and from the process used to move from the numbers to the decisions. Unfortunately, the pervasive belief that statistics and data summaries can give precise, objective and unassailable information about educational activity is deceptively simple and appealing. This is a human activity that requires not only capturing and organising ideas but also turning the information into meaningful actions (Senge et al, 1999).

Collecting and using data in schools is akin to painting a series of pictures – pictures that are subtle and changeable and capture the nuances of the subject. This is a far cry from stick drawing or paint by numbers. Imagine the experiences of Monet as he wandered through his beautiful garden at Giverny at different times of the day and the year, from different directions, with attention to different colours or textures or designs. His work was always driven by data – by the colours, textures, and images that he observed, investigated and responded to. He immersed himself in the place that was Giverny and used his considerable interpretative talent and experience to draw the salient features to the foreground, emphasise important dimensions and communicate a mood and a message to his audience. And he didn't paint one picture and call it Giverny. He painted hundreds; each capturing some of the subtleties of the world he inhabited (Earl and Katz, forthcoming).

Educators need to capture the images that matter and present these images to a range of audiences. And the images are always changing. Once again, the principals in Manitoba were clear. They know that using data is not like paint-by-numbers, but they don't know how to do it right.

Honestly, I don't have a clue about whether it's being achieved. Can I tell you conclusively that they are doing better as a result? No. But I wish I could.

This is one of the things administrators probably are caught for not doing – looking at the data and reading the data. We don't really know how?

And What About Synergy?

One of the principals in Manitoba was explicit and direct in pointing the way for those who produce, work with and understand data.

We actually need someone in here to help us orchestrate some evaluation. I just don't have anyone here with the kind of research background to know what we should be doing. We need somebody to come in, spend some time with us, go through where we are at in the project and help us get started at the evaluation. We really want to be able to say more about what we're doing and how it's working.

Perhaps it is unreasonable to expect a researcher or evaluator to be available to every school and school district in the country. But, if data are going to underpin educational decisions, educators need immediate and accessible support to help them gather, locate, interpret

and use data wisely and well – to paint the pictures. Politicians, lobbyists, interest groups, the media, bureaucrats, statisticians have a critical role to play in building the agency of educators. How?

- By accepting that, by virtue of their role in making data an integral part of educational decision-making, they have a responsibility to actively ensure the adequacy of the data and to engage in the debates and decisions that result from the data.
- By recognising that there is a monumental gap between what educators need to know and what they currently know about data, and intentionally work to narrow that gap.

There are undoubtedly many ways that leaders in governments, districts, unions, universities and other agencies that are in the “data business” and/or care about the use of can contribute to building the capacity of educational professionals. Here are a few:

Clarify Data Sources and Purposes

If educators (and others) are going to use data for decision in schools, districts, provinces and the public form, they need to know what data are available, in what form, with what accuracy, with what accessibility and for what purposes. Data banks need to be documented, cleaned and verified. If the data emerging from central repositories are not accurate, comprehensive and clearly described, there will inevitably be errors of interpretation and the possibility of poor, even damaging, decisions.

When data are collected about issues in education or educational institutions, the purposes inherent in the data collection activities ought to be clearly stated and adhered to. It is interesting that as the ethical procedures for research with human subjects are becoming more stringent and ensuring informed choice for the participants, freedom on information legislation makes raw data from public files available to

groups without any questions asked. What are the questions that the data are intended to answer? What limits are there on access to the data?

Identify Sound and Unsound Data

One of the first challenges for anyone interpreting data is to ascertain the quality of the data that they intend to use. Statistics and assessment do not have a life of their own. They are measurement tools. Human characteristics, like learning and achievement are not tangible, visible characteristics and the tests to measure them have been developed to try to provide *estimates* of these invisible human qualities. Patterns and trends like dropout rates or graduation rates require ongoing and systematic data collection. And, there are conventions and rules for the measurement of student achievement that are extremely important, especially when the results are being used to make significant decisions. Too often, the statistical symbolic representations of quality have been accepted as absolute, accurate, objective and unassailable descriptors of student achievement or of school or school system quality. Statistics and test scores may give the illusion of accuracy and objectivity but the numbers are only as good as the way in which the data collection instruments were developed, the thinking that goes into the interpretation and the statistical knowledge of the people doing the interpretation. For example, ranking of schools or provinces is the first inclination when test results are reported but there will always be some margin of uncertainty in the scores. When the uncertainty of measurement is taken into account, many and sometimes most of the differences in raw scores between schools or districts disappear. With small schools, the uncertainty can be very large. But raw score differences continue to be treated as if they were real and used to form opinions and make decisions about schools, even to reward them or to punish them.

There are many examples of inaccurate or misleading data contributing to bad decisions. Sometimes the problems with data are subtle and difficult to see. Perhaps the New York City assessment story is one of the most dramatic. An error in scoring resulted in inaccurate scores being calculated for students and for schools. Only the perseverance of an astute Research Director located the problem. He used the “reasonableness test” to discern that the scores didn’t seem to fit with the knowledge that he had about the schools. There was nothing wrong with the test but human error resulted in data that were inaccurate.

Not all data are created equal. For some, the existence of flawed data is sufficient reason to ignore or mistrust data, altogether. But to blame the data is unreasonable. When people use words to make false claims or offer unreasonable ideas, we don’t blame the English language. Rather than trashing all statements with numbers in them, a more reasonable response is to learn enough about the statistics to distinguish honest, useful conclusions from skulduggery or foolishness (Abelson, 1995). Identify and calling attention to the strengths and the weaknesses inherent in data is a critical role for the those who require it, gather it, analyse it and use it.

Explain Statistical and Measurement Issues

Making statistics accessible and understandable is another key responsibility. Data in education are generally measurements of something, often analysed using statistics. As strange as it may seem to people who work with data, statistical concepts are not familiar currency in most circles. Statistics strike fear into the hearts of many people. For the most part, educators have not seen statistics as a useful addition to their tool kit for decision-making. Instead, statistics are either imbued with a magical quality of numerical “truth”, or they are mistrusted as

blatant attempts to distort or to manipulate an audience. Neither of these positions is defensible. Too often, the statistical symbolic representations of quality have been accepted as absolute, accurate, objective and unassailable descriptors of student achievement or of school or school system quality. Abelson (1995) provides a much more appropriate description of the nature of statistics as analytic tools. He says “the purpose of statistics is to organise a useful argument from quantitative evidence, using a form of principled rhetoric” (p. xiii). Statistical operations have been developed by mathematics theorists to provide shorthand mechanisms for organising and considering ideas using mathematical notation and logic. According to Abelson (1995):

Good statistics involves principled argument that conveys an interesting and credible point. Some subjectivity in statistical presentations is unavoidable. ...It is all right, indeed essential, to argue flexibly and in detail for a particular case when you use statistics. Data analysis should not be pointlessly formal. It should make an interesting claim; it should tell a story that an informed audience will care about, and it should do so by intelligent interpretation of appropriate evidence from empirical measurements or observations.

Contribute to Interpretation

Data and statistics may provide the tools for measuring important educational concepts, but the numbers are only as good as the thinking that goes into the interpretation. Interpreting data is not a simple task. Data do not provide right answers or quick fixes. Instead, they are necessary but not sufficient elements of the conversations that ensue. Fullan (2001, p. 7) expresses it simply as “the problem of meaning is

central to making sense of educational change”. Data, presented in a variety of ways, offer the decision-makers an opportunity to view a phenomenon through a number of different lenses, to put forward hypotheses, to challenge beliefs and to pose more questions. Interpretation requires time, thoughtfulness, reservation of judgements and open challenge of, as well as support for, ideas. Very often, it also requires more information along the way to clarify or extend the possibilities. Interpretation, then, is thinking – formulating possibilities, developing convincing arguments, locating logical flaws and establishing a feasible and defensible notion of what the data represent. It requires a blend of wisdom, logic, and inquiry mindedness. Who better to contribute to this activity than people who have the knowledge and the experience of making sense out of data or who are using data to make decisions about education?

Audiences

Data form the raw material for communicating with various audiences. All too often, research reports or data summaries are presented in a manner that is either impenetrable to the intended audience or misunderstood by them. Jaeger et al. (1993) found that school report cards, designed by school and district officials and endorsed by school boards without any firm evidence about their effectiveness in meeting the needs of their intended audiences. When parents were surveyed, there was little congruence between the content of the reports and the information parents considered most important for them. Metaphorically, there is a story to tell; an image to paint, and data are the colours for the painting or the words and images for the story. Getting the images right depends on the purpose and the intended audience. The school report cards that Jaeger and his colleagues

investigated were intended to keep parents informed about their local schools. For the most part, they failed. Although overall, parents correctly identified the messages related to school quality 77% of the time, some of the report cards were misunderstood by 50% of the parents who received them. Attention to audience, presentation of data, interpretation and key messages can't be overlooked as essential elements in using data wisely.

Preparing reports using data is a challenging task. Not only do the reports based on data need to make sense and inform the various audiences. They also have to make it very hard for the data to be misunderstood or misinterpreted. The authors have to anticipate all of the possible misunderstandings and avoid them.

More Energy

Continuing the upward spiral from agency to more energy comes as a result of seeing the efficacy and the success of the venture. Data will become a routine part of educational decision making if the decision-makers have experience with using data and ascribe value to it. In the final analysis the important issue is one of validity. To what extent do the interpretations of the data reflect the reality that it was intended to measure? Data will be accepted if those who depend on it come to believe that having data adds quality to their decisions. It's as simple and as complex as that.

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