

Big Data and analytics can change education in three positive ways

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Big Data is described as the huge sets of electronic data that is available for analysing, whereas Analytics, according to Wikipedia, is "the discovery and communication of meaningful patterns in data." New technologies make it all possible, as they provide massive storage for any kind of data, enormous processing power, and the ability to handle virtually limitless concurrent tasks or jobs.

WHAT DOES THIS MEAN FOR EDUCATION?

Analytics profoundly shape the educational reality that they measure. What is measured and reported through the use of infographics or dashboards becomes more important than what is not reported. All levels of education are becoming data-driven organisations. 'Big Data' and the use of analytics can provide insights into some of the gnarly challenges associated with improving equity and excellence.



The key thing is human assumptions underpin data collecting, analysing, interpreting, and reporting, and these assumptions are then applied to the tools and analytics. For example, in the national and international analytics it is assumed that literacy, mathematics, and science achievement are essential life skills and signal that a country is preparing young people for the future. One problem with this is that readers of the reports may 'forget' things such as literacy is of service to the curriculum (and is not the curriculum). For example, in New Zealand, student success is about students being "confident, connected, actively involved, lifelong learner" (and achievement both leads to and is because of student success) (NZC and expanded in ERO indicators).

For learning organisations to be data-driven organisations, all assumptions should be transparent and checked to ensure that they align with the purpose of education and the outcomes we want for our young people:

1. Who are the 'we'? (does it include the young person, their family, and their teachers?)

2. How can we 'tell'? (are we relying on what appears easy to measure, or are we gathering a deep picture; and, with what confidence does this data tell us?)
3. What information will be used in the 'digital profile' (does it reflect the whole person; and, what information will not be used?)
4. What counts as learning and achieving (does it reflect our vision for young people and the experiences we wish them to have; and, how is 'what counts' decided?)

The assumptions brought to these questions are embedded worldviews and beliefs about young people, education, pedagogy and curriculum. We need to ask ourselves:

“ Do the analytics we use support all learners to develop the knowledge and capabilities needed to be confident, connected, actively involved, lifelong learners, and all educators providing young people with holistic educational experiences, or, are we using the analytics in ways that perpetuate inequality and not realise potential?”

If the purpose of analysing data is to provide feedback as to whether the intent of the teacher/ leader's actions is the reality in learner outcomes, then analytics can change education in at least three positive ways.

1. Analytics can provide faster feedback loops for students as they can provide rapid adaptation of teaching actions, and, therefore, quicker learning for students. In the past research knowledge was not easily accessible to teachers, and sometimes teacher practice did not reflect best practice. Now, this knowledge is used to design the analytics of online courses for students. For example, if an online reading programme has analytics to notice whether students answer questions that require inferencing, it can present learning activities to students who have been getting these questions wrong. Just like all effective learning activities, these online ones must be engaging and worthwhile, and the feedback needs to help learners know where they are at, where they are going, and how they are going. These programmes are designed to be part of a rich learning experience for students (ie, they do not replace the teacher). [Lovett, Meyer and Thistle](#) (2008) found in their study that, “OLI-Statistics students [blended learning] learned a full semester's worth of material in half as much time, and performed as well, or better, than students learning from traditional instruction over a full semester.”
2. Educators and researchers can develop a shared knowledge base when analytics are developed in collaborative discussions about the intent of actions, who determines what the outcomes are, and who receives what feedback can support. For example, Tony Bryk's [Carnegie Foundation](#) team of researchers help teachers discuss the assumptions associated with the question, Can we tell from your digital profile whether you are at risk of learning and achieving? They reduced complex literature into driver maps, developed related analytics, and tested personal theories. One collaboration found that the most powerful predictor of student success in College remedial mathematics courses is students' sense of belonging to their mathematics class. The teachers have now been trialling different ways to improve students' sense of belonging.

3. Analytics can be used to shift from the 'easier' to measure to the important. As educators, we know the importance of well-being, capabilities, competencies, and mindsets, the characteristics of 21C learners and leaders, but we have not had ways of knowing these things. Now, the technology will allow us to focus on what is important. Learning organisations will be able to provide parents and whānau information about the young person that is important to them. Literacy and mathematical achievement can be one of the indicators of learning and achievement rather than the only indicators.
For example, since 2009 Danish exams have analytics to assess students' ability to explore and sift information for sense-making, therefore, students need to use the Internet to undertake the exams. New Zealand's qualification authority has a [programme](#) to shift from internal and external assessment to one that emphasises assessment for learning.

QUESTIONS TO CONSIDER

What does being a data-driven organisation mean for our organisation, centre, school, or institution? The following questions may be a useful guide for the conversations:

- What data do you collect, and how do you use it?
- Does it make a difference for young people?
- What are the assumptions behind what you collect (and what you don't collect), how you analyse it, and how you use the analysis?
- What protocols do you have for the collection, access, and use of any data to ensure it is safe, and for the people entrusting you with it?
- How collaborative is the process — with young people, parents and whānau, teachers and leaders — in deciding what to collect, how to use it, how to feedback findings, and protocols?



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