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## DATA ANALYSIS SKILLS FOR TEACHERS

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Although accountability in the form of high stakes testing is in favour in the contemporary Australian educational context, this practice remains a highly contested source of debate. Proponents for high stakes tests claim that higher standards in teaching and learning result from their implementation, whereas others believe that this type of testing regime is not required and may even in fact be counterproductive. Regardless of what side of the debate you sit on, the reality is, that at present, high stakes testing appears to be here to stay. It could therefore be argued it is essential that teachers understand accountability and possess the specific skills to interpret and use test data beneficially.

This paper argues that teachers need some degree of knowledge and skills to successfully read and interpret the huge amount of test data which government testing agencies return to schools post-testing. Drawing on her experience in working with schools to interpret educational data, the author has outlined a bank of skills considered necessary for current teachers. The identified skills will enable teachers to unpack high-stakes test data for their own classes. The article concludes by outlining a data analyst course being conducted by a local University at Narangba Valley State High School, north of Brisbane. The suggestion is made that schools may have to initiate such programs to bring their staff's data analysis skills up-to-date and in line with the requirements of the current education accountability agenda.

### **Using test data**

In Australia, all students in Years 3, 5, 7 and 9 undertake the high-stakes National Assessment Program – Literacy and Numeracy (NAPLAN) tests. Over 1.2 million students from more than 9,000 government, Catholic and independent schools across Australia participate in the tests which began in 2008. Test results are reported in terms of each student's position in relation to a national minimum standard, and where s/he sits on a banding scale of ten levels of achievement. With such intense government surveillance, it is therefore necessary that all teachers of students from Years Prep to 9 (not just teachers of Years 3, 5, 7 and 9) are able to analyse test data.

With an escalation in accountability (Smeed, 2010), the ability to interpret and use test data is of paramount importance in schools (Earl, 2005). In fact, Balacco (2010) has posited a *Multiple Measures Model* to ensure that all relevant data is considered for improvement purposes. The model identifies four types of educational data – demographic, process, perception, and learner achievement. An example of demographic data is the Index of Community Socio-Educational Advantage (ICSEA) which is used by the Australian Government on its *My School* website for reporting on schools. Process data relates to the practices, programs, pedagogy and policies for delivering the school's curriculum. Perception data is commonly obtained through school satisfaction surveys where questions relate to the respondent's attitudes, experiences and beliefs. Finally student achievement data outlines the educational outcomes achieved by the learners. Balacco's model aims to encourage teachers to embrace the use of various types of data for improvement of learning outcomes. Under the current regime of high-stakes testing accountability, such a model may prove helpful for many teachers.

Accountability requirements are a major contributor to the phenomenon of tying more and more funding to performance (McWilliam, Taylor, & Perry, 2007). Though many teachers are now taking on board Hattie's (2005) suggestion that data needs to be available at the classroom level to improve their understandings of learners' needs, the reality is that test data is also increasingly used by policy makers to demand school improvement. It has become the comparative yardstick for systems, schools and the public (Fullan, 2006; Perry & McWilliam, 2007). In fact, Luke et al (2002) consider the role of educational data to be so important that it now outweighs historical and other factors (such as teaching quality, sporting facilities, religion, and cultural and pastoral activities) in school decision making.

Despite the move from the use of data solely to make student-based decisions to its use as a school performance indicator, schools still need to address both aspects. To improve their public perception, schools must first improve student performance. To do this, teachers need to possess the skills required to transform large amounts of data into useful, specific information about their classes (Earl, 2005). In fact, Earl (2005) suggests that data analysis should be fundamental to teachers' planning and classroom decision making. Specifically, she posits analysis, synthesis, organisation, reflection and investigation as essential skills for the classroom teacher in this current data-driven regime. In addition to these skills, Luke et al (2002) add the ability to track student performances over time.

While Earl (2005) writes about the higher-order thinking abilities of analysis and synthesis, Fullan (2006) sees educational data as an evaluative tool. He suggests it can be used in goal setting, evaluating, and as a performance indicator. In *Turnaround Leadership* (2006), Fullan comments that although indicators can be set, teachers need help to meet specific targets. He considers that, in time, teachers will become comfortable with the use of data, ultimately consulting it to make informed decisions when target setting. However, as literature (Barker, 2006; Barksdale-Ladd & Thomas, 2000; Fullan, 2001; McWilliam, Taylor & Perry, 2007; Tomlinson, 2001) suggests, the process of becoming familiar with data to maximise student performance is causing considerable pressure and some anxiety among teachers.

### **Skills for data analysis**

The above literature indicates that, at present, being able to interpret educational data is an important part of a teacher's work. This is something which needs to be addressed by the profession, the teacher education institutions and individual schools. Initial data collected from a survey of school principals along with evidence from discussions between the author and school leaders suggests that principals see the ability to analyse and interpret educational data as becoming an essential part of the classroom teacher's skill "kit". Some of the necessary skills include the ability to perform basic numerical and statistical operations, organise and re-organise data, identify trends, spot anomalies, apply the data to the relevant part of the curriculum, and address problem areas back in their teaching. Specifically, the essential skills revolve around:

- understanding the purpose and background of the test;
- unpacking information from table or graph form;
- understanding graphing conventions such as the use of a legend or key;
- identifying trends over several years;
- spotting anomalies;
- knowing where in the curriculum problems can be addressed;
- translating problems into knowledge through teaching;
- being able to compare class data with school, state or national data;
- prioritising; and
- understanding statistical concepts such as mean, median, range and standard deviation.

Although the above skills have been identified as important for teachers in a world where data interpretation is seen as one key to performance improvement, the author recognises that many teachers lack these required data analysis skills. For some, this new focus on the unfamiliar may lead to a short period of work intensification as teachers strive to acquire the necessary set of data skills (Greene, Winters & Forster, 2003; Luke, 2007; Pinar, 2004; Rowe, 2000; Ward, 2006).

It seems inevitable, however, that many teachers will have to enhance their abilities in the use of educational data. If test data remains on computers or sits in the drawers of staffroom desks, it has no power. Teaching will remain unfocused, and learning unchallenged and undirected. Test data should influence both what and how teachers teach (Christensen, 1999; Darling-Hammond, 2002). If the ability to interpret and use test data is a basic tool for the 21<sup>st</sup> century teacher, the profession as a whole needs to consider where such skills will be taught and provide the opportunity for teachers to up-skill in this area.

To address deficiencies in teachers' use of data, one school on the northern outer reaches of Brisbane has confronted the problem. Narangba Valley State High School has joined forces with a local university and is currently running its second 10-week course in data analysis for teachers. The first course was aimed at the skills necessary for Heads of Department, and the second (currently running) targets data use for classroom teachers. In ten 1-hour-per-week seminars, many of the skills outlined earlier in this article are addressed, and teachers then apply this knowledge to their own classroom practice and report back the following week. The second course is so popular that many of the Heads of Department have re-joined the group, along with teachers from feeder and other neighbouring state high schools.

## **Conclusion**

The current climate of accountability requires teachers to possess an array of additional and different skills from those needed in bygone times. Schools today have access to large amounts of educational data, and classroom teachers need to be able to work efficiently to analyse such data and adjust their practice accordingly. It is important for teachers to use data confidently to inform both what to teach and what not to teach. Possession of the specific skills identified in this paper will allow them to participate successfully in a regime of accountability and, hopefully, will empower them to improve the learning in their classrooms. The challenge for both the profession and schools is to ensure that teachers have the necessary skills to participate confidently and comfortably in this climate of test-based accountability; a challenge that is already being addressed by at least one school.

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