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Using the evidence of student achievement for improvements at individual, class and school level



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Abstract

Techniques using student work as direct and visible evidence of achievement, of the repertoires of practice of students and teachers, provide a powerful opportunity for teachers and schools seeking to improve the learning of the students they have. This is a purpose different from that of the analyst modelling patterns in large data sets of test scores or the concerns with complex causality found in small-n studies and the methods consequently differ. Critical elements of techniques for using student work include the value of seeking a student, rather than subject or teacher, perspective, open to both the official – what is recognised as part of school – and the unofficial – unrecognised factors that underpin students' practices.

This paper describes the nature, use and importance of some powerful techniques through which teachers can use data to improve student learning.

For a teacher, the central purpose of analysing data is to improve the learning of one or more *particular* students. That is, the individual teacher and the school take the students who come to them and seek to improve the learning of those students. This purpose is different from that of the sociologist seeking to understand patterns of participation, or that of the policy analyst seeking to understand the impact, if any, of policy settings. The possibly powerful generalisations about a handful of key variables produced by nomothetic

analyses of large data sets often provide little guidance to the individual teacher, who must be concerned with the complex particularity of individual students and groups of students.

Of course, these statements about teachers and students rest on assumed archetypes of:

- learning as including (but not restricted to) broad and deep understanding
- the teacher as professional, inquiring and reflecting on practice to achieve more learning by more students
- the student as a whole person, living in and across a time and place and embedded in cultures¹.

Such archetypes push into the background those data techniques that are more suited to the notions of teacher as technician, following codified instructions in the use of some test scores to focus coaching effort for gains in terms of a uni-dimensional latent trait. The techniques explored in this paper can help teachers to identify teacher and student repertoires of practice². Luke et al. (2005) describe the hypothesis that effective teaching involves 'weaving' – shifting kinds and levels of knowledge as needed. In these terms, teachers draw on repertoires of practice as they work with students, weaving these together. Students draw on repertoires of practice, some of which they bring with them from outside the school and others which are learned, developed or modified through their experience of school.

¹See Gutierrez and Rogoff (2003).

²'Repertoires of practice' is a helpful term from cultural sociology now being increasingly used in discussions of pedagogy. Its broader meaning refers to the idea that regularities in our performances or actions (language, gestures, rituals, routines, rhetorics) can be understood in terms of 'toolkits', set of models, from which we select and combine (more-or-less unreflectively) (Sheffy, 1997).

Indeed, learning itself can usefully be seen as the development by the student of particular repertoires of practice³.

The teacher's concern with improving the learning of particular students means some distinctive characteristics for data gathering and analysis.

First, the methods and results of what Ragin (1997) calls the variable-oriented researcher are not useful – there are too few students, too many facets to consider and the students interact with each other, with the teacher and with their wider socio-cultural contexts. Teachers often seem intuitively aware that some fundamental assumptions required by statistical studies seeking to find effective educational treatments ('taking this action causes that effect') are not sound. Brady and Seawright, (2004) discuss this in terms of the potential failure of a key assumption required by controlled or randomised experiments, one which implies that 'each supposedly identical treatment

really is identical and that each unit is a separate, isolated possible world that is unaffected by what happens to the other units' (Brady & Seawright, 2004).

Secondly, while the methods of what de Meur and Rihoux (2002) call qualitative comparative analysis⁴ offer the researcher an opportunity to understand patterns of complex causality in small-n populations⁵, they present significant technical and operational challenges to the teacher seeking to understand and improve what is happening in a particular classroom.

Thirdly, students bring their complete selves with them when they interact with school – a 'dunno' can be laconic, resentful, defensive, uninterested, diversionary or intentionally misleading rather than a simple attestation of a deficit of not knowing (not remembering, never encountered, didn't realise) easily remedied by an instruction session. Cooper and Dunne (1999) have shown from UK data the importance of

understanding what students bring with them and their knowledge, understanding and acceptance of 'doing school' – Bourdieu's habitus and Bernstein's recontextualisation – their 'feel for the game' (Cooper & Dunne, 1998), for making sense of students' responses to various types of mathematics assessments.

Data about what actually happens in school⁶ can be relatively direct or indirect⁷. Direct data includes student work⁸ – potentially the most valuable outer sign of internal activity – and structured classroom observations⁹. More indirect data includes the evidence from student and teacher reflections (through conversations and surveys) and test results. Student and teacher comments and reflections are more indirect in that they are statements about what people think is happening as mediated through their ways of seeing the world¹⁰. Teacher statements about enacted practices, in particular, often seem strongly coloured

³Especially so when we seek learning that is powerful, transferable and oriented towards meeting a future of unpredictable demands and opportunities.

⁴See <http://smalln.spri.ucl.ac.be/>. Ragin (1987) uses the term Qualitative Comparative Analysis (QCA). The methods in QCA have, however, a quantitative aspect in the inclusion of Boolean minimisation algorithms originally developed in digital electronics.

⁵Katz et al. (2005) present an interesting comparison of the results of fuzzy set QCA (Cronqvist, 2003) and regression analysis in an analysis of causality in economic development in Spanish America.

⁶The term 'enacted curriculum' is helpful, but can be misleading. Studies of the 'enacted curriculum' seem to focus more on what teachers say about what they do, more than on what happens or how students experience it. See for example <http://www.secsupport.org/overview.htm> for materials and Porter (2004) for a discussion of differences between the intended (standards), enacted (teacher priorities) and assessed (tests) curriculum.

⁷In this context, 'direct' and 'indirect' are similar but not identical to the distinction historians draw between 'primary' and 'secondary' sources.

⁸'Student work' is used here in the most general sense, not restricted to culminating performances, formal assessment or testing.

⁹See, for example, the coding scheme used in the Queensland School Reform Longitudinal Study (Education Queensland, 2001). The need for trained observers and multiple observations over time (a single lesson does not sample the complexity of practices that could be part of a teacher's repertoire) make this type of evidence less accessible on a regular basis.

¹⁰Student comments can be very helpful, nonetheless. See Cooper and Dunne (1999) for examples of the insights that are only readily apparent with the use of student comments – students who gave the 'wrong' answer to 'realistic' problems sometimes did so because they took the 'realistic' setting of a task at face value. Student comments can also remind us of the gap between our intentions and their interpretations. The author once sought feedback about the Queensland Year 12 Writing Task from a small group of students selected from the highest achievers – a group that included students who write for pleasure and profit. The Writing Task was designed to provide students with opportunities to do their very best writing, to showcase their writing skills in their preferred genre whatever that might be. They told us, however, that this was 'school' and that school doesn't want your best writing, only the writing that fits its expectations.

by their intentions and their feelings about what *ought* to be happening.

Tests provide teachers with indirect evidence about what is happening – an estimate of the ability (and propensity) considered to underpin particular knowledge and skills – an indirect indication about aspects of what has happened. Tests are, of course, coloured by their sample nature and by the varying ways students choose (or don't choose) to respond to them. It may seem so obvious and simple that tests can provide diagnostic evidence – so that a teacher knows what needs to be done for the student to learn more. Practice is more complex. For example, as part of the reform of its lycées, France had developed in the 1990s a national program of testing specifically designed to be diagnostic, for teachers to adapt their pedagogy to meet the needs of their students (see, for example, <http://artic.ac-besancon.fr/espagnol/pages/evalsec.htm>). In mathematics, for example, the teacher codes student responses, and tables in the teacher's guide suggest that various combinations of successes and failures are associated with different needs and proposed remediations. Not surprisingly, teachers (for example, <http://www.ac-versailles.fr/pedagogi/anglais/joinin/miseenplaceremediation2nde.htm>) find it not so simple – there's a lot of work scoring and then coding responses, there are students with widely varying backgrounds, widely varying responses to the test situation and other familiar problems.

In summary, for teachers seeking to improve student learning, as a data source, student work is more easily accessible than structured classroom observations, it provides more direct, visible and complete evidence of both student and teacher repertoires of practice¹¹ than do test scores and it supports the types of analysis needed by the classroom and school situation of small numbers and complex causality.

There is growing interest in the use of student work to improve learning – see, for example, www.lasw.org, Cushman (1996), Little et al. (2003). Critical elements include the need:

- for expert facilitation and carefully designed protocols – teachers can find the task of looking at the work itself both difficult – they want to (re-)mark it – and troublingly – there are notions of territory, of privacy and perhaps worries about being judged and found wanting
- to avoid 'deficit' models – the students and/or the teacher 'didn't get it' (Little et al., 2003) – but to look for the attitudes, values, priorities and ways of doing things that are evidenced in the work (and the presence or absence of teacher comments and other signs)
- to identify and see through and beyond what is being taken for granted by the teacher and the student.

In the late 1990s, the author led the development and piloting of a resource for Queensland senior secondary schools seeking to review their practices (Allen & Bell, 1999). This involved a skilled facilitator using a structured process centred on student work. As well as the critical elements listed above, a particular characteristic of the process was that it took a student-centred focus rather than subject focus. That is, it sought to use a set of collections of the work of individual students¹² as the direct evidence for asking questions about the enacted values, priorities and practices in the set of subjects experienced by a student. To make the task as straightforward as possible, the sets of student work were, for the first stage of review, chosen to be those of students who were generally successful – the students who were not 'resistant' to the enacted culture of the school, who knew how to 'play the game'. The techniques encouraged by the facilitator and the protocols could be seen, roughly, in terms of the 'hermeneutic circle'¹³ or, in simpler terms, as the sorts of interpretations that historians and anthropologists practise when documents are the only evidence they have for understanding some social practices¹⁴. An initial focus on the surface, obvious features of the evidence, including any evidence of teacher comments, codes and signs, was followed with closer examination of

¹¹Gutierrez and Rogoff (2003) emphasise the importance of a focus on activities rather than individual traits.

¹²Queensland had a system of externally moderated school-based assessment for high-stakes subjects. Students typically took six subjects each studied for two years. The moderation process required compilation of a folio (collection) of a student's work providing the evidence that supported the final decision about a level of achievement (criteria and standards based) in a subject. Thus, a collection of a single student's work for this project was a set of five or six folios each containing a variety of tasks.

¹³A reading of the texts in the light of pre-judgements is subjected to critical examination in the light of the texts.

¹⁴There are cuneiform texts from Sumerian schoolrooms that give us some (limited) picture of their enacted values, priorities and practices. See Sylvan (2004) for an account of methodological issues involved in using these sorts of perspectives.

what activities seemed to be emphasised and what de-emphasised in practice – using the assumption that the students whose work was being looked at would seek to maximise their return for effort and thus enacted attitudes, values and priorities could be inferred from the evidence.

Taking a student focus rather than a subject focus was often a particular challenge for participating teachers, as was seeing the implicit, enacted priorities rather than the intended or designed.

At the end of the process, teachers' findings included that:

- some generally desired behaviours (for example, clear and accurate written expression, clear mathematical argument) were in practice rewarded/encouraged/required in only one subject – with consequences that the behaviour was exhibited within but not outside that classification; the knowledge and skills did not transfer from one situation to another
- in some schools, there appeared to be greater reward for effort for careful presentation than for serious intellectual rigour – these schools often started the process because of concerns that their students performed relatively less well in higher order thinking tasks than they expected
- what was declared to be the official intention of an assessment task was not necessarily what was rewarded/favoured in practice¹⁵

- a school's view that there was effective use of technology across the curriculum was not supported by sets of student work that showed, for example, that computers were being used mostly as electronic typewriters
- across one school's curriculum, the enacted variety and complexity of 'problem-solving' was less than individual subject areas believed it to be – the sort of result that only comes readily through teachers taking a whole student rather than an individual subject perspective
- across the curriculum of individual students there was a narrower range of extended writing than they expected
- with the ideas from this sort of review they could draw useful interpretations of the patterns in the QCS¹⁶ test score data they had.

These findings are probably not surprising, of course. They illustrate, however, the potential of this sort of technique for developing teachers' understanding of the impact of practices rather than intentions and of the importance of seeking to understand school from a student perspective. Once teachers were familiar with the practice and techniques of this sort of study, there was real additional value in a successful follow-up review using the work of students who did not experience success – a more challenging task (less evidence, more possible interpretations) but potentially very fruitful, as demonstrated by Cooper & Dunne's

(1999) exploration of the varied reasons students had for giving 'incorrect' responses to mathematics test items.

This technique looks at all the evidence in the artefacts (the student work), including teacher and student marginalia, the 'unofficial' as well as the official. There's much potential value in taking as complete a view as possible. A look at the marginalia of students' responses to some items on a Queensland Core Skills Test showed, for example, that there were many students who have in effect learned that anything that looks at all 'mathematical' is not for them; regardless of how carefully an item has been constructed to provide a friendly and easy entry to the task. A study of Queensland Year 10 Mathematics folios included a wonderful example centred on the problematic nature of so-called 'problems' but illustrating the recontextualising, the demands on knowledge, skills, attitudes and values of 'doing school'. Here was a 'problem' (actually not a problem – the answer was obvious on inspection). The full text (student response and teacher marginalia) strongly suggested the following scenario: the student wrote down the obvious answer; remembered that 'working' had to be shown and constructed some semblance of it (it didn't work); the teacher attempted to follow the working, couldn't, gave up and then marked the response as correct, giving full credit.

These approaches are, especially in the shorter term, essentially ameliorative

¹⁵In audiences in different countries, the author has found general recognition that a university assignment that is declared as 'wanting your own opinion' should not be taken simply at face value.

¹⁶Schools were provided with comprehensive and detailed score analyses of their year 12 students performances in the Queensland Core Skills Test – a test of generic skills, using multiple choice, short response and extended writing formats to assess students' achievements in terms of common curriculum elements, such as reading, writing, evaluating, synthesising, judging, inferring, deducing.

rather than fundamentally reconstitutive. Teachers need data gathering and analysis techniques that work in the here-and-now, providing some ways to improve matters for their students. Avoiding not only deficit models but also both an emphasis on intentions and too restrictive a focus¹⁷, the use of student work provides a practicable basis for identifying key aspects of what is and what might be, at an individual, class and school level. Starting at the school level builds the skills to look at what *is* rather than what is *intended* and the consensus building involved in working at this level supports the individual teacher in looking at student repertoires of practice at the class and the individual level. At the same time, teachers develop their understanding of the range of teacher repertoires of practice¹⁸.

One of the practical challenges of using student work noted by Little et al. (2003) is the tendency for teachers to select culminating, 'show' pieces. It can be salutary to collect the full set of student work completed by a student across all classes for, say, a four-week period – the author has observed cases where there was little if any artefactual evidence of any worthwhile activity by students and involvement by teachers. Some will say, of course, that the really important learning is necessarily not¹⁹ evidenced by anything anyone can produce – the classroom is a private space.

Such claims are not refuted by dismissing them as defensiveness, an unwillingness to be accountable – there's a scholarly tradition that the silences, the gaps, the interstices speak

louder than the text. To improve student learning, however, the direct and comprehensive evidence of achievement in the point-at-able form in which it appears in student work provides a data source that can be used to generate rich analyses.

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¹⁷Strong classifications serve as a constraint on teachers, of course, as well as students.

¹⁸Including the filters through which they see and understand student responses – there's a lot of taken-for-granted understanding of what it is to 'do school', there can be wide differences between what we say and what students hear.

¹⁹This is the strong version of this claim – a weaker version is 'not necessarily'.

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