

Fast-tracking value-added analysis to ensure fairer assessment: A South African perspective

Executive summary

There is mounting pressure to demonstrate accountability of public expenditure in South Africa. In education, this means an increasing public demand to find causes and remedies for inadequate learner achievement. South Africa has a high enrolment rate and a high investment rate in education (about 5 per cent of GDP), but education is still of unsatisfactory quality (reflected in poor results from international and national standardised assessment). Naming and shaming dysfunctional schools has been discussed in policy circles as a possible approach to hold schools accountable and potentially address this challenge. We argue in this policy brief that such a policy would only be fair when *school effects* have been isolated from other *contextual effects* that may impact learning outcomes. In this regard, this policy brief proposes wider usage of value-added assessment (VAA) and analysis (which provides a more reliable estimate of the value added – the extent to which schools make a difference in their learners' achievement levels) in policy decision-making.

What is value-added assessment?

Historically, successful schools have been perceived as those which

demonstrate high test scores. However, this perceived success is often tainted by many factors exogenous to the schools – for example, parental income and education level, parental involvement and expectations regarding academic success, family stability and mobility, and neighbourhood environment (employment income and other factors). A school with a learner-intake profile reflecting weaker socio-economic settings, thus resulting in an overall weaker learner mix, may demonstrate higher instructional effectiveness, a better learning environment or test-score gains but may produce poorer test results because of the learners' disadvantaged start-off. Given that learners in South Africa are not randomly assigned to schools and, therefore, teachers' failure to reconcile the influence from these non-school-related factors could result in unfair assessment or invalid comparisons of school performance.

VAA is a statistical tool that addresses this problem by controlling for social background factors, such as demographic and socio-economic characteristics and learners' prior attainment. Instead of relying solely on raw test scores, VAA models, using data on learners' background, provide additional (and potentially more accurate) analysis of levels and gains in their achievement, 'levelling

the playing field' among teachers, schools, districts and provinces with substantial differences in learner intake. These models provide estimates of within-schools differences as well as between-school differences. More importantly, with built-in variables on learners' and schools' characteristics, the model can better determine the impact of a teacher/school/district versus other socio-economic factors, thereby allowing a fairer comparison of schools with learners of dissimilar socio-economic characteristics.

VAA is not without limitations. For example, it still relies heavily on learner testing to demonstrate teacher or school effectiveness; it is only as good as the quality of the tests themselves; it can only be applied to tests that collect data on background information. Its gauge of effectiveness has demonstrated fluctuation (particularly at teacher level; Baker & Xu 1995), and it is known to be more accurate in identifying high and low performers than in distinguishing between the majorities that cluster in the middle (Braun 2005; Gordon et al. 2006). In spite of these limitations, however, there is consensus that VAA provides more significant insight into learner and school performance over simply comparing achievement scores without controlling for contextual factors.

Socio-economic status or effective teacher/school factors: The use of VAA

The academic gap associated with race has prompted sustained investigations of the impact of socio-economic status (SES) on achievement in the United States for decades. Findings mainly allude to socio-economic factors – such as income and education level of parents, as well as mother’s age at first birth – which significantly trap black learners in a vicious cycle of an unfavourable learning environment and low achievement (Fryer & Levitt 2004).

Having controlled the above-mentioned socio-economic factors, economists Fryer and Levitt demonstrate that the black-white school-entry gap disappears. However, the same authors report a reappearance of the gap within the first two years of schooling, with the trend of the gap steadily widening over time. The authors propose school effects, particularly school environment indicators (such as gang problems), to explain this reappearance (Fryer & Levitt 2004).

Other recent effective-school studies concur with the importance of effective teachers and schools, particularly for low-achieving learners. For example, in their Dallas Independent School District cohort study (the majority of learner participants were entitled to free lunch – a proxy for low SES), Babu and Mendro (2003) conclude that low-achievement learners assigned to effective teachers

continuously benefit exponentially (Figure 1; see also Gordon et al. 2006). Other authors (Chetty et al. 2011) also denote other longer-term positive impacts from higher value-added teachers and schools, including a greater likelihood of learners attending college, earning higher salaries, living in better neighbourhoods and saving more for retirement. Further, there is less chance of teenage pregnancy. The ironic reality, however, as Babu and Mendro point out, is that low-achieving learners are twice as likely as high-achieving learners to be assigned to ineffective teachers.

Literature, including meta-analysis, in the developing countries in sub-Saharan Africa, Asia and Latin America has traditionally recorded weak correlation between SES and learner achievement (Heyneman & Loxley 1983; Fuller 1987). Instead, in these contexts, school effects (particularly basic physical educational facilities) have been found to be much stronger, especially below the threshold of a certain national income level (Gamoran & Long 2006). Despite critiques of possible methodological inadequacy for many studies conducted in the developing countries, the relatively stronger school/teacher effect (compared with the relatively weak school/teacher effect and stronger SES effect from the developed countries) is expected to hold.

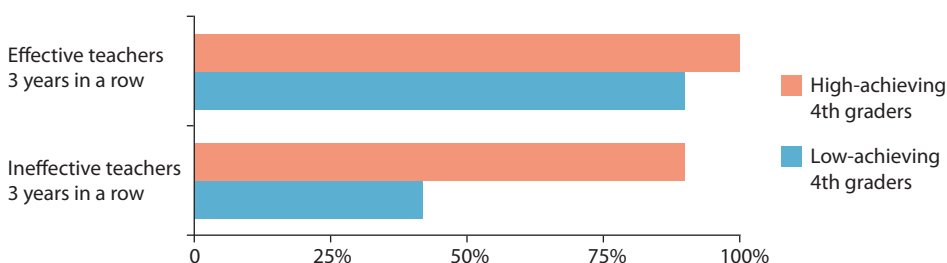
The term VAA appeared in the educational arena as early as 1978, although it only became comfortably used by academics and policy-makers,

mainly in the UK and the USA, in the 1990s. In the UK, the national system of achievement testing, with its results published in league tables, was introduced in 1992. A simple value-added method was piloted (but not published) in 1998, linking Key Stage 4 (Grades 10–11) outcomes to Key Stage 3 (Grades 7–9). In 2001, a further pilot of both Key Stage 2–3 (Grades 3–9) and Key Stage 3–4 (Grades 7–11) measures was conducted. In the following year, value-added scores for these key stages were published for all secondary schools. The first value-added scores for primary schools were included a year later, in 2003 (Ray 2006).

Use of VAA in South Africa

VAA is particularly relevant to the South African context because the school system exhibits extremely large between-school variations (Hungu & Thuku 2010). Although this is understandable as the result of historical legacies, it is severely unfair to judge the effectiveness of the education system purely on raw test scores, especially when these results might be used in high-stake effectiveness evaluation in order to name and shame or close down ineffective schools. VAA has been absent from the mainstream educational discourse as only a few educational research publications in South Africa are based on VAA methodology. The publications (see, for example, Frempong et al. 2011) demonstrate that for most learners, the background characteristics of the schools they attend, and especially the socio-economic status of learners within schools, are the major determinants of successful schooling. This means that most of the learners who are less successful come from poor homes and attend schools with limited resources. Teachers and principals in these schools have to deal with this double jeopardy without adequate training. We contend that policy decisions such as naming

Figure 1: Percentage of students passing Grade 7 maths test



Source: Babu and Mendro (2003)

and shaming or closing down schools without VAA would be unfair.

In June 2008, the Development Bank of South Africa (DBSA) board chair Jay Naidoo brought together a panel of three principal partners – Zweli Mkhize (the head of the ANC Education and Health Subcommittee), Naledi Pandor (then minister of education) and Naidoo himself – to discuss key issues in education in South Africa. The outcomes included concrete suggestions to draw up a roadmap for education for South Africa. The process of examining problems and developing possible solutions was further advanced when a broad stakeholder group met at the DBSA on 25 July 2008 to analyse key problem areas in schooling. In November 2008, a report entitled 'Education Roadmap' and its 10-point multi-layered policy-intervention programme was produced. Point 4 specifically recognises the importance of VAA. It reads: 'Ensure effective evaluation of all teachers based on extent to which learner performances *improve ...*' (Bloch 2009, emphasis in original). Since 2008, some recommendations made by the roadmap have been implemented: for example, recommendation 3 of conducting external tests for all Grade 3 and 6 learners every year has taken the form of the trial of the Annual National Assessment (ANA). The VAA recommendations were planned to be incorporated into data collected through the ANA, but this has since not been implemented. This is largely due to the current emphasis on the ANA to provide valid and reliable data and, most importantly, to meet deadlines for the announcement of results.

Fast-tracking VAA in policy decision-making in education

The continuous promotion of VAA in South Africa, beyond the work done by individual researchers, would require that an integrated assessment system

be developed to allow the linkage of learners' achievement scores to their demographic and school characteristics. Fast-tracking the use of VAA as a policy decision-making tool is thereby proposed, particularly in the following arenas:

- Incorporate VAA analysis in the ANA. In the 2013 State of the Nation Address, President Zuma intimated that the ANA has become an important research instrument for providing evidence of improvement in school quality linked to policy decisions and strategies. We contend that fair and accurate policy decisions are most likely when, for example, in each school, analysis of the ANA data provides the principal and teachers with a clearer picture of their school-improvement challenges and the possible solutions. A VAA analysis of the ANA data within schools where variations in learners' achievement levels are linked to their background characteristics and schooling processes can be useful in developing evidence-based solutions to improve teaching and learning. We argue that access to this evidence-based information about schools can help districts and provinces make informed policy decisions. We recommend the fast-tracking of VAA data collection and analysis in the ANA processes.
- Incorporate VAA data collection and analysis on higher-stake standardised assessment reporting, such as matric. The announcement of the results of high-stake matriculation examinations has always created heated discussions about the health of the South African education system. In the absence of contextual data that make it possible for researchers to carry out VAA analyses of the sources of variation and improvement in learners' achievement levels, it is difficult to make evidence-based contributions

to inform these discussions. We strongly recommend to the South African Council for Quality Assurance in General and Further Education and Training (Umalusi) and the South African Department of Basic Education to employ VAA data collection and analysis in the reporting of the matric examination results.

- Organise discussions among scholars, policy-makers and leaders of schools to exchange their experiences related to the challenges and the potential of applying VAA. Recognising the complexities and challenges in understanding VAA, we recommend continuous discussions and debates among education stakeholders for the purpose of educating the general public about issues related to VAA and education quality improvement.
- Create data integration and curation centres that provide data and opportunities for capacity development in VAA methodologies. A number of institutions such as the Human Sciences Research Council (HSRC) are currently engaged in data curation of education data sets. We see the potential of these institutions serving as centres for capacity development in VAA methodology and vigorously engaging in secondary data analysis to continuously inform school-improvement policies.

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