



High Value-Add Schools: Key Drivers of School Improvement

Centre for Education Statistics and Evaluation



Publication and contact details

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1. Introduction

Overview

All educators strive to lift the achievement of their students. Educational researchers aim to assist in this effort by identifying the initiatives that are most likely to yield sustainable improvements in student performance. One approach to building this understanding is to examine the strategies in place in schools that have demonstrated significant improvements in student achievement over time. The current study aimed to examine the key drivers of improvement in NSW government schools that have shown high growth in student outcomes over time. In this study, high growth schools were identified using a robust value-added methodology that isolates the contribution that a school makes to growth in student achievement while controlling for important contextual factors that may influence student performance.¹ A mixed-methods approach, including a range of qualitative and quantitative analyses, was taken to explore the common factors associated with the performance improvements observed in High Value-Add (HVA) schools.

Results showed that HVA schools had a strong focus on:

- effective collaboration
- engaging and sharing in professional learning
- setting whole-school goals and strategies for change
- using explicit and effective teaching strategies
- creating an environment that promotes learning and high levels of student engagement
- setting high expectations for achievement.

These factors closely align with the effective practices identified in the recent Centre for Education Statistics and Evaluation (CESE) publication *What Works Best: Evidence-based practices to help improve NSW student performance* (CESE 2014a).

Background

The School Excellence Framework² sets out the key elements of effective schooling and explicitly references the value a school adds to student achievement as a key measure of school excellence. This focus on school performance is critically important if school systems are to effectively reduce the educational gap experienced by students from socially disadvantaged backgrounds. For example, students who attend a high performing school have been estimated to be up to 7 months ahead of comparable students at lower performing schools over the course of two years (CESE 2014b). Critically, recent research suggests that students from disadvantaged backgrounds derive greater benefits from attending a high academic quality school compared to their more advantaged counterparts (Lim, Gemici & Karmel 2013).

In order to successfully lift student achievement at a school-level, educators and policymakers need a clear understanding of which initiatives and strategies are most effective in achieving sustainable improvements in student performance. However, there has historically been a lack of reliable evidence bearing on which initiatives, or which combination of initiatives, might be most effective (CESE 2014a). One approach to building this understanding is to examine schools that have demonstrated marked improvements in student outcomes over time.

1 For more information on the value-add methodology, see Centre for Education Statistics and Evaluation 2014c, Value added models for NSW government schools, technical paper, report prepared by L Lu & K Richard.
2 <http://www.dec.nsw.gov.au/about-the-department/our-reforms/school-excellence-framework>

Much of the empirical literature in this area has focused on 'turnaround' schools, usually defined as those schools that have successfully transitioned from chronically low performing to high performing over some period of time (Jensen 2014). A recent analysis conducted with a small case study sample of turnaround schools in Australia identified five key initiatives that consistently work in lifting student performance: strong leadership that raises expectations, effective teaching that takes a collaborative approach, developing and measuring effective learning, cultivating a positive school culture, and successfully engaging parents and the community (Jensen 2014).

Recent North American research identified a complementary set of factors: clear accountability mechanisms, strong instructional leadership, strategic staffing, intensive professional development and use of data to identify and assist struggling students (Herman & Huberman 2012). In addition, in a recent synthesis of outcomes from School Improvement Grants for turning around chronically low performing schools, the Center for American Progress has emphasised the importance of whole-school approaches, noting that "turnaround schools work purposefully and deliberately to create collaborative, positive and enriching school cultures with high expectations for all students" (Miller & Brown 2015, p. 10).

While this body of research has focussed on the transition of schools from low performing to high performing, it is important to note that these findings are not limited to facilitating change in low performing schools. Indeed, the factors identified above are also relevant to achieving improvement in schools with higher baseline starting points (Jensen 2013).

While the research on turnaround schools provides a good indication of the mechanisms required to lift school performance, this body of research is limited by a reliance on qualitative data (Jensen 2013). This makes it difficult to discern whether the initiatives identified in the research have had a causal impact on school performance or whether there are other, unobservable strategies that have driven change within a school (Jensen 2013). Correlates of school performance are also strongly influenced by the methodology used to identify turnaround schools (Jensen 2014). For example, use of absolute attainment measures can lead to misidentification of turnaround schools because attainment measures are strongly related to factors outside of the schools' control (e.g. socio-economic status). Any correlation between activities occurring within the school and apparent growth in student achievement in these schools may therefore be spurious.

Value-added models overcome this weakness by explicitly controlling for these contextual factors when estimating the contribution the school makes to growth in student achievement. Any correlations between school-level activities and student outcomes using value-added models of student achievement are therefore likely to give a less biased estimate of the true drivers of school improvement.

The objective of the current study was to further contribute to the evidence base on what works in lifting school performance using a rigorous value-added measurement framework to identify high growth schools. It also aimed to more comprehensively examine the drivers of school improvement by employing a mixed-methods approach examining a range of factors potentially associated with school performance. Importantly, the current research focussed on schools that had shown high growth in student performance over time, irrespective of their starting point. The intention of this approach was to gain an understanding of the key drivers of school-level growth that could be applicable across a broad range of school contexts.

The current study used data from the National Assessment Program – Literacy and Numeracy (NAPLAN) assessment, which has been administered annually to students in Years 3, 5, 7, and 9 since 2008. While literacy and numeracy only captures some aspects of student achievement, NAPLAN results are a valuable indicator of a school's performance in any given year and can be used to examine trends in performance over time. CESE has developed a value-added (VA) modelling approach to measure growth in NAPLAN scores at the student- and school-level (CESE 2014b; 2014c). This methodology measures growth in NAPLAN scores while accounting for relevant student- and school-level characteristics, as well as students' prior school performance. In effect, this model allows for a prediction to be made about the expected level of growth in NAPLAN scores for each school given students' prior performance and the various school and student characteristics.

The difference between the school average actual growth and the predicted growth – known as the school VA score – is assumed to be attributable to the school learning environment. However, as with any statistically derived score, there is an associated level of uncertainty. For each school, the level of uncertainty in the VA score can be expressed as a confidence interval within which we are statistically confident that the true score lies. If the entire confidence interval is positive, this suggests the school adds significantly more growth to student learning than those same students would achieve in an average school (i.e. significantly above average performance). If the entire confidence interval is negative, this suggests the school adds significantly less growth than those students would achieve in the average school (i.e. significantly below average performance). If the confidence interval straddles positive and negative values, then the school adds the average (expected) level of growth to student learning given the characteristics and prior performance of the students (CESE 2014c).³

In the current study, the VA approach was used to identify 37 High Value-Add (HVA) NSW government schools (17 high schools and 20 primary schools). Between 2010 and 2014, these schools achieved improvements in NAPLAN scores that exceeded predicted growth based on the characteristics of students attending those schools. Results were based on NAPLAN growth scores for Years 3 to 5 for primary schools and Years 7 to 9 for high schools. HVA schools were selected on the basis of having VA scores in 2013/2014 and 2012/2013 that were significantly above the baseline year (2010/2011), therefore demonstrating that the school had made a substantial unique contribution to improved student outcomes over time.⁴ The final sample of 37 HVA schools included:

- 19 schools that moved from significantly below average to be either average or significantly above average
- 10 schools that moved from average to above average, and
- 8 schools that began as above average performers and continued to show significant growth on the VA measure over time.

The primary aim of the current study was to examine the common factors associated with the performance improvements observed in HVA schools. The key research questions addressed in this study were:

1. What school-level factors or initiatives were the key drivers of improved student outcomes in HVA schools?
2. What teaching practices or strategies were the key drivers of improved student outcomes in HVA schools?

³ It is important to note that negative VA scores do not suggest that the school reduces growth in student achievement. All schools add value to student achievement; however, some add more value than others.

⁴ A further criterion applied to primary schools was an enrolment count of at least 20 students in each year from 2010 to 2014.

2. Method

Design

A mixed-methods approach was taken to understand the factors associated with the improved performance observed in HVA schools. The approaches used in this study included:

1. Qualitative interviews examining school-level changes from 2010 to 2014:
 - conducted with school leaders and teaching staff in a sample of 14 HVA schools (7 primary schools; 7 high schools).⁵
2. Quantitative analyses examining differences between all HVA schools and a sample of matched control schools on a number of measures which may have been associated with school performance. The measures included:
 - trends in student attendance rates from 2010 to 2014
 - trends in student suspension rates from 2010 to 2013
 - trends in school-level staffing characteristics from 2010 to 2014
 - measures of student engagement from the 2013 administration of the *Tell Them From Me* (TTFM) student survey
 - measures of teachers' self-assessment of their use of effective teaching practices from the 2014 *Focus on Learning* (FoL) teacher survey.

The approach taken in each of these analyses is described in detail below. Importantly, all analyses focussed on understanding the key drivers of change that were common across HVA schools. Any number of context-specific factors undoubtedly contributed to the VA improvement observed in these schools. However, the aim of the current study was to identify the factors that are common across HVA schools so that these factors might be applied more broadly across the system.

Qualitative Interviews

A series of qualitative interviews and small focus groups were undertaken with school leaders (i.e. Principals, Deputy Principals) and teaching staff at a sample of 14 HVA schools (7 high schools; 7 primary schools). These schools were selected from the overall sample of 37 HVA schools on the basis of two criteria:

- the steepness of the improvement (i.e. slope of the growth) in VA scores from 2010 to 2014. This was determined by fitting a linear trend to VA scores over time. Schools with the greatest increase in VA scores from year to year were prioritised for inclusion in interviews.
- the extent to which the improvement was consistent and sustained from 2010 to 2014 (to ensure that the improvement was real and not transient).

Principals at each school were contacted and asked to participate in interviews. Following agreement to participate, school leaders were asked to nominate staff to take part in the interviews. Where possible, Principals were asked to include staff who had been at the school through the period from 2010 to 2014 and could speak to changes over time. Semi-structured interview discussion guides were developed that focussed on possible drivers of improved school performance. Interviews were semi-structured insofar as they prompted interviewees to reflect on whether improvements were related to leadership initiatives, strategic school priorities, staff collaboration, student engagement, use of data to guide practice, school culture, parent and community engagement, and teaching strategies. These factors have been identified in the literature as key drivers of student achievement (Hattie 2009; The Learning Bar 2015). While these topics were used to guide discussions, respondents were also encouraged to freely report what they thought were the key drivers of improved student outcomes.

⁵ Interviews were not conducted at any control schools.

In primary schools, interviews were conducted with the school leadership team and any key staff members involved in teaching or programming for students in Years 3 to 5. In high schools, interviews were conducted with the school leadership team and key staff involved in teaching or programming for students in Years 7 to 9. Within each school, discussions ranged from approximately 30 minutes to one hour and were audio recorded. Recordings were then transcribed and subjected to a thematic qualitative analysis to identify the key drivers of school improvement that were common across HVA schools. The coding scheme for the thematic analysis was determined collaboratively by two coders, who reviewed a small sample of three transcripts and devised a coding framework that encompassed the breadth of material discussed in the interviews. Each coder then independently verified the scheme against an additional two interview transcripts to ensure it was appropriate for analysis. Following verification of the coding scheme, the remainder of the transcripts were analysed independently by each of the coders.

Quantitative Analyses

A case-control analysis was undertaken to compare HVA schools to a number of matched control schools that demonstrated similar baseline performance but did not show high growth in achievement over time. This analysis was undertaken on a number of measures that could reflect school change, as described in further detail below. Control schools were selected according to the following criteria:

- classification in the same VA performance band as the matched HVA school in 2010/2011. VA scores are summarised into three performance bands: significantly below average, average, and significantly above average.
- showing either no change or a decline in VA performance band to 2013/2014. For example, a HVA school identified as significantly below average in 2010/2011 was matched to control schools that were significantly below average in 2010/2011 and remained in this performance band in 2013/2014. HVA schools identified as significantly above average in 2010/2011 were matched to control schools that were also significantly above average in 2010/2011, but showed a decline in performance (to either average or significantly below average) in 2013/2014.
- similar socio-economic status as the relevant HVA school. This was assessed using the Family Occupation and Education Index (FOEI), which is a school-level index of educational disadvantage related to students' socio-economic background (i.e. parent education and occupation) developed by CESE (2014d).⁶
- similar geographical classification. This was assessed using the Accessibility/Remoteness Index of Australia (ARIA) classification of geographic remoteness (Australian Bureau of Statistics 2011). This classification includes the following categories: Very Remote, Remote, Outer Regional, Inner Regional and Major Cities. Control schools were selected if they were identified in the same or adjacent ARIA remoteness category as the relevant HVA school.
- school selectivity status.⁷ Where possible, high schools were matched directly on selectivity status. However, in four instances, partially selective HVA high schools were matched with non-selective control high schools. In addition, one fully selective HVA high school was excluded from further analysis, as no fully selective high schools could be identified as appropriate control schools.⁸

Following matching, 36 HVA schools (20 primary schools and 16 high schools) and 69 unique control schools (36 primary schools and 33 high schools) remained. Due to similarities in the profiles of some HVA schools, there were instances where a control school acted as a comparison for more than one HVA school.

6 FOEI scores have a mean of 100 and a standard deviation of 50. Control schools were selected on the basis of having FOEI scores within one standard deviation (50 points) of the relevant HVA school. However, in two cases, this criterion was extended, to 64 and 57 points respectively, to identify a matched control school.

7 The NSW government school system has 17 fully academically selective high schools with admissions determined through students' performance on the Selective High School Placement test. There are an additional 25 partially selective high schools that offer academically selective classes (http://www.schools.nsw.edu.au/gotoschool/types/shs_ahs_details.php).

8 In this instance, no fully selective control high schools could be identified that had the same VA performance as the HVA school in 2010/2011 (significantly above average) and showed a decline in performance to 2013/2014.

Student Attendance and Suspensions

Student attendance rates were examined across HVA and control schools as a proxy measure of any potential differences in levels of student engagement. Differences in average student attendance rates across all HVA (n=36) and control schools (n=69) were examined for each year, from 2010 to 2014.⁹ In addition, a binary variable was created for each school that represented whether the attendance rate within a school was higher in 2014 than in 2010. Analysis was then conducted to determine whether there was any difference across HVA and control schools in the proportion of schools that observed an increase in attendance in 2014 relative to 2010.

Student suspension rates were examined across HVA and control schools as an indicator of changes in student behaviour over time. Trends in suspension rates at all HVA (n=36) and control schools (n=69) were examined over time for each year, from 2010 to 2013.¹⁰ Suspension rates were calculated by summing the count of suspension episodes in each year for each type of school (i.e. total suspension episodes across all HVA vs. all control schools) and dividing by the total number of enrolments for each school type.¹¹ In addition, data for unique student suspensions was examined for 2012 and 2013, where a rate was again calculated based on total enrolment headcounts at HVA and control schools.

Analyses focussed on whether the suspension rates (for episodes and unique suspended students) differed for HVA and control schools across each year. In addition, a binary variable was created for each school that represented whether the suspension (episode) rate within a school was higher in 2013 than in 2010. Analysis was then conducted to determine whether there was any difference across HVA and control schools in the proportion of schools that observed an increase in the suspension rate in 2013 relative to 2010.

Staff Characteristics

Trends in school-level staffing characteristics were examined across all HVA and control schools over time. This analysis focused on the following key variables:

- staff position type: principal, executive, teacher (2010 to 2014)
- staff demographic characteristics: gender, age (2010 to 2014)
- staff separations: resignations, retirements (2010 to 2013)
- staff mobility: transfers, promotions (2010 to 2013)
- length of service: within government schools, within current school (2010 to 2014)
- staff qualifications: master/doctoral level degree (2012 to 2014).

For each of the above characteristics, proportions were calculated using the permanent total headcount to control for differences in school size (e.g. female teachers/permanent staff headcount) for each year. Proportions for each characteristic were then averaged over the years for which the data was available. Analyses focussed on examining whether there were any differences in staffing characteristics, averaged over time, across all HVA and control schools.

9 Attendance rates in NSW government schools are calculated on the basis of absences and enrolled days. Further information on the calculation of attendance rates can be found here: http://www.cese.nsw.gov.au/images/stories/PDF/2014_Attendance_Bulletin_v2.pdf

10 Suspension data for 2014 were not available at the time this analysis was undertaken.

11 Suspension episodes include both long and short suspensions. This count may include multiple episodes for any given student and suspensions for a single student could appear against multiple schools.

Student Engagement: *Tell Them From Me* (TTFM) Student Survey

Student engagement was examined using measures drawn from the TTFM student survey (developed by The Learning Bar). The intention of the TTFM survey is to provide school leaders with “insight into student engagement, wellbeing and effective teaching practices at their school, from the perspective of the students” (see http://surveys.cese.nsw.gov.au/images/Student_survey_FAQs_.pdf). The TTFM survey was administered to a sample of 172 government high schools in Term 3, 2013.¹² This sample included 21 control high schools and nine HVA high schools.¹³ The current study focussed on student responses across the following six domains:

- social engagement (e.g. participates in sports/clubs, feels a sense of belonging)
- institutional engagement (e.g. values schools outcomes, shows positive behaviour at school)
- intellectual engagement (e.g. interest and motivation, skills/learning challenge)
- quality instruction (e.g. teaching relevance and rigour, effective learning time)
- classroom context (e.g. positive teacher-student relations and learning climate)
- family context (e.g. advocacy outside of school and student aspirations).

For the current study, student-level responses (scored from 0 to 10) for each of these six domains were derived for the surveyed students in the identified 30 schools.¹⁴ This includes responses from 13,211 students across 21 control schools and 6,284 students from nine HVA schools. To examine whether engagement levels were higher among students in HVA schools compared to control schools, a multi-level modelling approach was taken to account for the clustered nature of student responses within schools (i.e. students are nested within schools). For this analysis separate multi-level models were constructed for each survey domain (as separate dependent variables), with school status (HVA vs. control) and student year level as independent variables.¹⁵

Also, due to differences in the way that each school sampled their students and potential differences in levels of engagement across year cohorts, the random slope for student year level was included in each model to test whether the relationship between student engagement and year level varied across schools. If the slope was significant (p -value $< .05$), it was included in the model; otherwise it was excluded. The outcome of interest in this analysis was the regression coefficient for the independent variable representing school status (HVA vs. control), which indicates whether levels of engagement differ between students in HVA versus control schools. A significantly positive coefficient (p -value $< .05$) indicates that students in HVA schools have higher levels of engagement relative to students in control schools.

¹² This administration of the TTFM survey did not include any primary schools.

¹³ It is important to note that the sample was comprised of all HVA and control schools that participated in the survey. Due to the relatively small sample of schools included in this survey administration, it was not possible to restrict the sample to only matched pairs of HVA and control schools.

¹⁴ Domain-level responses for each student were calculated by averaging their responses across the relevant sub-domains.

¹⁵ The model also included school-level random effects which control for any omitted variables that are constant over time and are uncorrelated with the independent variables.

Teacher Self-Assessments: *Focus on Learning (FoL) Teacher Survey*

Teacher perceptions of the use of effective practices within their schools were examined using measures drawn from the FoL teacher survey (developed by The Learning Bar). The intention of this survey is to provide school leaders with “insight into school and classroom effectiveness, from the perspective of the teachers” (see http://surveys.cese.nsw.gov.au/images/Teacher_survey_FAQs_.pdf). In particular, this survey measures teacher perceptions of eight evidence-based aspects of effective schools that have been shown to contribute to student learning (http://surveys.cese.nsw.gov.au/images/Teacher_survey_FAQs_.pdf):

- leadership
- teacher collaboration
- classroom learning culture
- the use of data to inform practice
- the use of effective teaching strategies
- the use of technology in the classroom
- school inclusiveness
- parental involvement.

Teacher survey data for the current study were drawn from the first administration of the survey in NSW to a sample of 513 government schools in Term 4, 2014. This sample included 320 teacher responses from 15 primary schools (nine HVA and six control schools) and 1,353 teacher responses from 26 high schools (13 HVA and 13 control schools).¹⁶ For the current study, individual teacher responses for each survey measure (scored from 0 to 10) were derived by averaging responses to relevant survey items. In addition, this administration of the survey included a separate item examining teachers’ engagement in professional learning to improve their classroom practice (scored from 0 to 10).

Similar to the approach taken with the TTFM student survey data, multi-level models were used to examine whether teachers in HVA schools were more likely to report using measures of effective practice than teachers in control schools. For the current analysis, separate multi-level models were constructed for each survey measure (as separate dependent variables) with school status (HVA vs. control) as the independent variable. The outcome of interest in this analysis was the regression coefficient for school status, which represents the difference in scores for teachers in HVA schools versus those in control schools for each measure. A significantly positive coefficient (p -value < .05) indicates that teachers in HVA schools are more likely to report using measures of effective practice than teachers in the control schools. Furthermore, supplementary multi-level models were tested for primary and high schools separately, to determine whether there were any differences in the pattern of responses across school type.

¹⁶ It is important to note that the sample was comprised of all HVA and control schools that participated in the survey. It was not possible to restrict the sample to only matched pairs of HVA and control schools.

3. Results

Qualitative Interviews

Four interrelated themes emerged from thematic analysis of the qualitative interviews in HVA schools. These included: leadership; whole-school approaches; teacher professional learning; and, teaching strategies.

Leadership

In HVA schools, the leadership model was often described as strategic, consultative, supportive and transparent. One of the key strategic approaches used by the executive staff in recent years was to use data to build a clear and focussed direction for the school and to drive whole-school changes in practice. To this end, executive respondents most commonly reported relying on NAPLAN data for planning, drawing on both domain and item level analyses to identify areas of particular weakness at a school-level and to target strategies for improvement. For example, one school's NAPLAN analysis revealed a weakness in persuasive writing at the school-level which they subsequently addressed through a whole-school literacy initiative focused on writing techniques. Other sources of data commonly used to support executive planning at the primary school level included Best Start, the Literacy and Numeracy Continua and Language, Learning and Literacy (L3) data. Executive staff in high schools commonly reported using HSC results, and in some instances, the Literacy and Numeracy Continua.

Teachers in HVA schools frequently reported that their leadership teams were consultative, approachable and that teachers felt they had "a voice" in planning and decision-making. In some instances, this manifested in a collaborative structure between teaching and executive staff in which there was a sense of shared responsibility across all staff for student outcomes. In addition, in some schools teaching staff reported feeling a "sense of ownership" in decision-making by being given opportunities to take leadership roles, where appropriate, within the school. In addition, some teachers commented that leadership teams promoted an "open door policy", in which teachers could feel comfortable and supported in discussing difficulties and had the opportunity to engage in collaborative problem solving.

Whole-School Approaches

The majority of respondents interviewed described a collaborative approach to programming, where resources were shared among staff as a critical part of driving whole-school improvement. Shared planning occurred within and across stages/faculties, resulting in consistent programming and sequencing at a school-level and a common approach to teaching as students moved between years and subjects. This shared approach to teaching and planning was also evident in supporting students with additional learning needs, including those at-risk of falling behind and those students excelling beyond their year level. Respondents spoke about how this collaborative and shared approach to programming broke down classroom 'silos' and led to a culture where "staff aren't competitive, they are collaborative."

Respondents also reported that whole-school planning days and regular staff meetings that addressed relevant issues within the school were effective ways of building a collaborative culture and creating common school goals. Respondents at several schools mentioned having a whole-school focus, such as development of literacy skills, as an example of how strategic change could be facilitated such that staff throughout a school understood the common goal and the role they played in reaching it.

Furthermore, many respondents reported that high levels of collaboration at HVA schools brought about a consistent set of expectations across a school – both academically and behaviourally. Academically, this included collaborative staff marking and sharing student work samples to ensure that teacher judgements were consistent and that a culture of high expectations was cultivated for all students. Behaviourally, this included having a common set of guidelines across a school that rewarded positive behaviours and had a transparent set of procedures for responding to negative behaviours. The Positive Behaviour for Learning (PBL) program was mentioned by several schools as an effective way of establishing consistent and explicit behavioural expectations across a school.

Teacher Professional Learning

Staff at HVA schools reinforced the need for professional learning to be collective, relevant and sustainable, rather than professional learning “for the sake of professional learning”. Having a whole-school approach to professional development was seen as vital to the success and subsequent implementation of strategies learned through professional development opportunities. In this respect, a whole-school approach included training all relevant staff in particular programs or strategies, or having particular staff members attend professional learning and then sharing their knowledge with other staff through internal professional development exercises. Interviewees reported that this approach enabled a shared professional dialogue across the school, which fostered further professional development and kept learning current.

In addition, professional learning in HVA schools was clearly built into the strategic directions of the school such that staff understood the relevance of the learning and its applicability in the broader school context. For example, when asked about how professional learning in their current school was different to any previous experiences, several respondents noted that professional learning in their current school contributed both to individual and school goals, whereas in previous environments it tended to focus more on individual development and was less clearly applicable to broader school goals.

In terms of the sustainability of professional learning, respondents reported that utilising internal expertise to promote learning and opening classrooms to other staff were key to the longevity of any particular strategy. This was supported by regular staff meetings, which were reported as another more formalised way for staff to share knowledge and lead professional learning for the school. Open classrooms were viewed as a way to further break down ‘silos’ between classrooms and to encourage teachers to reflect on practice and foster peer review.

Teaching Strategies

There were four key themes that emerged in relation to teaching strategies that have been key drivers of school improvement: use of data to identify and respond to students’ needs; differentiating the curriculum; explicit approaches to teaching; and keeping students engaged through innovative programming.

Most interview respondents noted that their approach to teaching included regular monitoring and close examination of student assessment data to identify individual student’s learning needs. Importantly, this strategic use of data was reported to be a more concrete and consistent focus than it had been in the past. This ‘knowing the students’ approach was considered integral to effectively target students’ learning needs and was also crucial in intervening early with students requiring additional support. Several schools also reported using prior year’s student assessment data as a way of familiarising themselves with incoming students’ needs before the beginning of the school year.

Adapting teaching practice to meet identified needs was seen as vital to keeping students engaged and ensuring that the expectations placed on students were achievable. Respondents reported using a range of methods to differentiate their teaching, including use of ability groupings, individualised learning plans for students at-risk of falling behind, and preparation of extension activities for high performing students. In addition, some respondents reported using differentiated assessment tasks to create individual learning goals that were attainable for all students.

In terms of classroom teaching strategies, a number of respondents mentioned the importance of using explicit instruction where students were clearly shown what was required of them and the steps they needed to take in order to complete a task. This also included showing students exemplars of success so that students had a clear picture of what they should be aiming to achieve in each lesson or task. To this end, respondents spoke about modelling lessons for students and scaffolding their teaching so that students understood how to achieve learning outcomes.

Finally, many respondents noted the importance of making learning relevant to students and placing the curriculum in a ‘real world context’, as being crucial to promoting and maintaining high levels of student engagement. In this context, some staff spoke about using technology and innovative learning methods (e.g. visual learning) to keep students engaged in the classroom. Some respondents also spoke about using a flexible approach to programming in their classrooms, where they could adapt their approach to changing class needs throughout a year to ensure that student engagement was sustained.

Quantitative Analyses

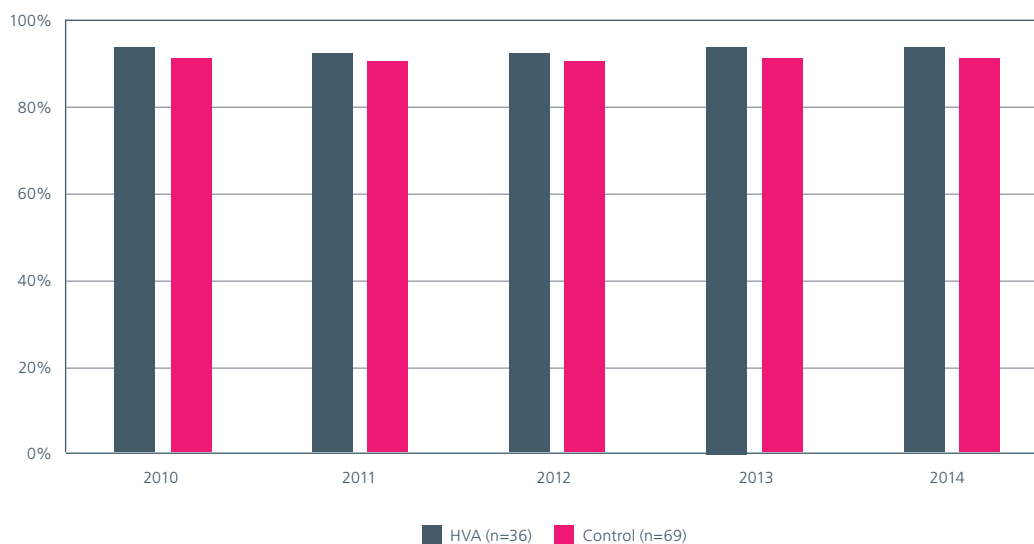
Student Attendance and Suspensions

Figure 1 shows the average attendance rates across all HVA and control schools for each year, from 2010 to 2014. As shown in the figure, attendance rates in both types of schools were consistently high, exceeding 90% across all years.

Figure 1:

Average attendance rates for HVA and control schools (2010 to 2014)

Source: Statistics Unit, Centre for Education Statistics and Evaluation (CESE)



Analyses could not be conducted to test whether the difference in attendance rates between HVA and control schools in each year were statistically significant due to the complexity of the formula used to calculate attendance rates. However, there was some tentative evidence to suggest that attendance rates improved in HVA schools over time relative to control schools. When attendance rates were analysed separately for primary and high schools, results showed similarly high attendance rates in excess of 90% across both school types.

In the primary context, the difference between HVA and control schools was very small in each year (less than 0.4%), but from 2010 to 2013, control primary schools showed marginally higher attendance rates than HVA primary schools. However, in 2014 the attendance rate was slightly higher in HVA primary schools (94.5%) relative to control schools (94.4%). In addition, there was some evidence that the attendance rate increased more in HVA primary schools over time (0.9%) relative to control schools (0.4%).

In the high school context, the attendance rate in HVA schools was higher than control schools across all years, with some evidence that the gap between HVA and control schools increased over time (from 2.6% in 2010 to 3.0% in 2014).

Furthermore, results summarised in Table 1 revealed that a significantly higher proportion of HVA schools (primary and high schools combined) observed an increase in the attendance rate (83.3%) over time (2014 vs. 2010) relative to control schools (59.4%) ($p < .05$).

Due to concerns about the margin of error associated with the measure of attendance rate for each calendar year, supplementary analysis was undertaken comparing the pooled average attendance rate in 2013/2014 to the average rate observed across 2010/2011 for HVA and control schools. Results of this analysis revealed a similar trend to that summarised in Table 1, however, the differences between HVA and control schools were smaller and not statistically significant. In light of this, the differences in attendance rates reported above should be viewed with caution.

Table 1:

Proportion of HVA and control schools that observed an increase in attendance rate in 2014 relative to 2010

Was the attendance rate in 2014 higher than in 2010?	Control Schools (n=69)	HVA Schools (n=36)
No	40.6%	16.7%
Yes	59.4%	83.3%

Note. Differences were statistically significant ($\chi^2(1) = 6.178$; $p < .05$).

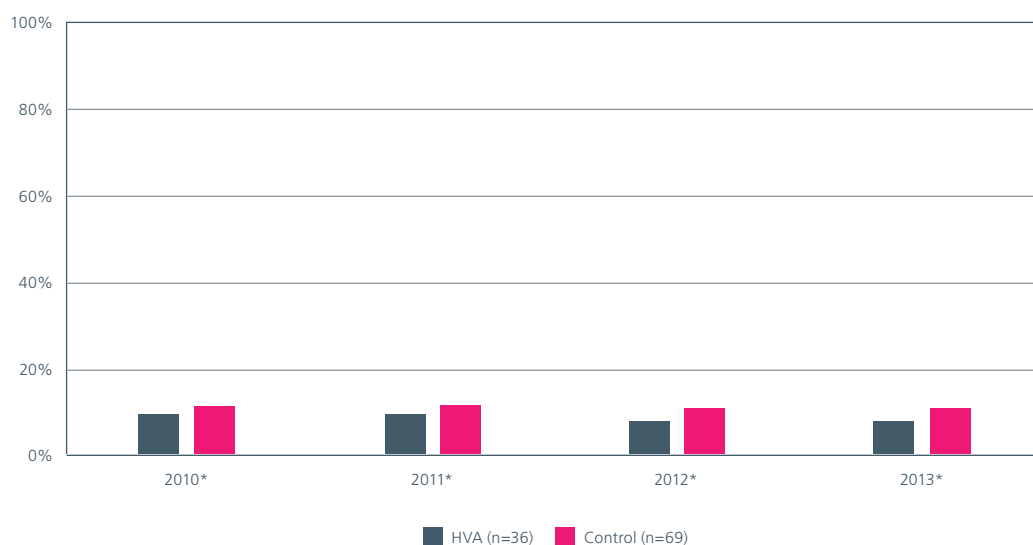
Source: Statistics Unit (CESE)

With regards to suspension rates (episodes), results presented in Figure 2 show relatively low rates across both HVA and control schools from 2010 to 2013. However, despite the low baseline, the rate of suspension episodes was significantly higher in control schools relative to HVA schools across all years (all p -values $< .001$). For example, in 2013, the suspension rate in control schools was 10.3% versus 6.9% in HVA schools. A similar pattern of results emerged when suspension rates were examined in relation to unique students in 2012 and 2013 (p -values $< .001$).

Figure 2:

Average suspension (episode) rates for HVA and control schools (2010 to 2013)

Source: Statistics Unit (CESE)



Note. z-tests of proportions showed statistically significant differences between HVA and control schools for each year (all p -values $< .001$).

When suspension rates were analysed separately for primary and high schools, similar results to those presented in Figure 2 were observed in the high school context, with control schools showing higher suspension rates relative to HVA schools in each year. In the primary school context, the opposite pattern emerged with HVA schools showing higher suspension rates relative to control schools across all years. However, despite the higher rate of suspensions in HVA primary schools, examination of trends over time revealed a decline in the suspension rate for HVA primary schools (from 6.3% in 2010 to 4.8% in 2013), while an increase was observed in control primary schools (from 2.7% in 2010 to 3.1% in 2013).

Furthermore, examining whether the suspension (episode) rate was higher in 2013 relative to 2010 at the individual school-level (see Table 2) revealed that a significantly higher proportion of control schools observed an increase in the suspension rate (42.0%) relative to HVA schools (19.4%) ($p < .05$).

Table 2:

Proportion of HVA and control schools that observed an increase in the suspension rate in 2013 relative to 2010

Was the suspension (episode) rate in 2013 higher than in 2010?	Control Schools (n=69)	HVA Schools (n=36)
No	58.0%	80.6%
Yes	42.0%	19.4%

Note. Differences were statistically significant ($\chi^2(1) = 5.356$; $p < .05$).

Due to concerns about the margin of error associated with the measure of suspension rate for each calendar year, supplementary analysis was undertaken comparing the pooled average suspension rate in 2012/2013 to the average rate observed across 2010/2011 for HVA and control schools. Results of this analysis revealed a similar trend to that summarised in Table 2, however, the differences between HVA and control schools were much smaller and did not reach statistical significance. In light of this, the difference in suspension rates should be viewed with caution.

Staff characteristics

Differences in staff characteristics across HVA and control schools were examined using non-parametric rank-sum testing. Results summarised in Table 3 show that, averaged across time, HVA schools had a slightly higher proportion of teachers (relative to executive staff)¹⁷ and younger teachers (aged less than 50) compared to control schools (all p-values $< .05$). In contrast, control schools had a comparatively older workforce (aged 50 plus) with a longer length of service within government schools (4+ years) and marginally more staff retirements (which is probably also reflective of workforce age).

Table 3:

Differences in workforce composition characteristics for HVA and control schools, 2010 to 2014

Characteristic	Control Schools (n=69)	HVA Schools (n=36)	p-value
Teachers*	77.4%	78.7%	.046
Female teachers	71.5%	74.2%	.313
Teachers aged < 30*	7.3%	11.1%	.002
Teachers aged 30-49*	45.6%	50.1%	.031
Teachers aged 50+*	47.1%	38.8%	.002
Resignations	0.7%	0.8%	.323
Retirements*	4.2%	3.1%	.013
Transfers	2.8%	3.4%	.890
Promotions	1.1%	1.2%	.306
Length of service (4+ years) *	85.9%	82.4%	.035
Length of service in current school (4+ years)	62.2%	60.5%	.474
Postgraduate qualifications (Masters, Doctorate)	8.1%	10.0%	.066

Note. Data for resignations, retirements, transfers and promotions was only available from 2010 to 2013 and data on postgraduate qualifications was only available from 2012 to 2014. Significant findings are marked with an asterisk and shown in shaded rows.

Staffing characteristics were also analysed separately for high schools (16 HVA and 33 control schools) and primary schools (20 HVA and 36 control schools) to determine whether there were any differences in characteristics across school type.

In the primary school context, results showed that HVA schools had a significantly higher proportion of younger teachers, aged less than 30, relative to control schools ($p < .05$). No other statistically significant differences emerged among primary schools.

Source: Workforce Analysis and Planning Unit (Department of Education)

¹⁷ It is important to note that this finding may be a function of school size, whereby larger schools are likely to have a higher ratio of teachers to executive staff.

In the high school context, results showed a similar pattern to the findings summarised in Table 3, with HVA schools having a higher proportion of younger teachers (aged less than 50), while control schools had a comparatively older workforce, including more staff retirements. In addition, teachers in HVA high schools were more likely to have a postgraduate (Masters/Doctorate) qualification (15.2%) relative to teachers in control high schools (11.8%) (all p-values < .05).

Student Engagement: TTFM Student Survey

Students in HVA high schools reported significantly higher levels of engagement relative to students in control high schools across a number of measures (Table 4). Specifically, students in HVA schools were more likely to report:

- being socially engaged, including participating in sports and clubs, and feeling a sense of belonging
- being institutionally engaged, including valuing school outcomes, engaging in positive homework behaviour and showing positive behaviour at school
- being intellectually engaged in English, Mathematics, and Science, including being interested, motivated and challenged in their subjects
- receiving quality instruction in English, Mathematics, and Science, including rigorous and relevant teaching strategies, and effective learning time
- having positive perceptions of their class context, including good teacher-student relationships and a positive learning climate.

As shown in Table 4, the largest differences between HVA and control high schools were observed for quality instruction in relation to Mathematics, institutional engagement, quality instruction in relation to English and class context. Furthermore, results examining year level effects across high schools revealed that students in lower years showed higher levels of engagement across all domains compared to students in higher years.¹⁸

Table 4:

Differences in measures of student engagement (TTFM) across HVA and control schools

Source: CESE

Measure of Engagement	No. of observations	Difference (HVA – Control)	p-value
Social Engagement*	19,469	0.25	.003
Institutional Engagement*	19,453	0.50	.037
Intellectual Engagement (English)*	18,394	0.26	.005
Intellectual Engagement (Maths)*	17,882	0.25	.012
Intellectual Engagement (Science)*	16,668	0.28	<.001
Quality Instruction (Language)*	18,286	0.45	.010
Quality Instruction (Maths)*	17,852	0.51	<.001
Quality Instruction (Science)*	16,642	0.26	.025
Class Context*	18,966	0.45	.025
Family Context	18,985	0.13	.137

Note. Difference refers to the regression coefficient for the dummy variable indicating whether the students are in HVA schools or control schools in the multi-level model. A positive difference with p-value less than .05 indicates that student engagement levels are significantly higher in HVA schools compared to control schools. Significant findings are marked with an asterisk and shown in shaded rows.

¹⁸ This administration of the TTFM survey did not include any primary schools.

Teacher Self-Assessments: FoL Teacher Survey

Teachers in HVA schools (primary and secondary combined) were significantly more likely than their counterparts in control schools to report:

- engaging in collaborative practice with other teachers to develop learning opportunities and to receive feedback on teaching
- promoting a positive learning culture, including setting high expectations and making learning relevant to students
- using effective teaching strategies, including setting clear learning goals and giving regular feedback to students
- engaging in professional learning to improve their teaching practice

As summarised in Table 5, the largest difference between teachers in HVA and control schools was observed for engagement in professional learning.

Table 5:

Differences in teacher perceptions of effective practice across HVA and control schools

Source: CESE

Measure	No. of observations	Difference (HVA – control)	p-value
Leadership	1,670	0.15	.525
Collaboration*	1,671	0.22	.044
Learning culture*	1,671	0.19	.045
Data informs practice	1,671	0.17	.059
Teaching strategies*	1,671	0.25	.002
Technology	1,671	0.27	.098
Inclusive school	1,671	0.04	.671
Parent involvement	1,669	0.01	.948
Professional learning*	1,635	0.39	.009

Note. Difference refers to the regression coefficient of the dummy variable indicating whether the teachers are in HVA schools in the multi-level model. A positive difference with p-value less than .05 indicates that teachers in HVA schools are more likely to report using more effective teaching strategies than teachers in control schools. Significant findings are marked with an asterisk and shown in shaded rows.

Results from supplementary analysis including only high schools showed that teachers in HVA high schools were more likely to:

- use effective teaching strategies (d=0.24, p=.007)
- use technology to support student learning (d=0.49, p=.005)
- engage in professional learning to improve their practice (d=0.36, p=.016).¹⁹

However, comparing HVA and control schools in the primary school context revealed no statistically significant differences in teacher survey responses, likely due to the small number of teacher responses from primary schools (n=320).

¹⁹ These results are all reported using multi-level models. d refers to the difference in the scores between teachers in HVA schools and teachers in control schools. P-values less than <.05 indicate that the difference is statistically significant.

4. Discussion

The outcomes from this exploratory analysis have identified a number of factors that appear to be associated with the growth observed in HVA schools. The strong focus on teacher collaboration and access to relevant professional learning to improve practice was clearly emphasised in both qualitative interviews and results of the teacher survey. The efforts outlined in the interviewed HVA schools to know the students and use explicit teaching strategies was strongly supported by both the teacher survey and the student engagement results. Furthermore, the triangulation of evidence from stakeholder interviews and survey data suggests that setting high expectations for students that are consistent across the school may contribute to improved student achievement.

HVA school teachers were more likely than teachers in control schools to say that there was a positive learning culture in their school. Students in HVA schools were also committed to succeed academically and value their school outcomes (e.g. intellectual and institutional engagement). Consistent with some of the outcomes observed in the empirical literature on turnaround schools (e.g. Jensen 2014; Miller & Brown 2015) HVA schools also reported strong emphasis on leadership, whole-school initiatives and shared goal setting. In the current study, these appeared to be critical foundational elements to achieving improvements in student outcomes.

The current study also showed some differences in staffing characteristics across HVA and control schools, most notably in relation to the age of staff. HVA schools had a comparatively younger workforce (i.e. aged less than 50) than control schools. However, this does not necessarily indicate that younger teachers are more effective than older teachers, as no attempt has been made to adjust for the impact of potentially confounding factors in this analysis. In other words, it may be the case that teacher age is acting as a proxy for some other factor or set of factors that relate to student achievement. For example, younger staff may be more likely to engage in particular types of practices, such as collaborating and supporting other staff members, engaging in professional learning to develop their practice, using technology to engage students, and making learning relevant to the students.

Given that these factors were also correlated with improvements in school performance, it may be that those characteristics explain the findings instead of teacher age. However, this contention is speculative and further research is required to better understand the impact that teacher demographic characteristics have on achieving school-level improvements in student performance.

There was some evidence to suggest that HVA schools had increases in attendance in 2014 relative to 2010, while control schools were more likely to observe an increase in suspensions in 2013 relative to 2010. However the effects were small and somewhat variable depending on the assumptions made in the statistical analyses. In any event, it is unlikely that increasing attendance and decreasing suspension episodes caused growth in school academic achievement. If these effects were real, they are more likely to be the result of the activities that HVA schools implemented to engage students and manage behaviour. However, these findings add to the growing body of research showing that engaging students in learning is critical to achieving successful academic outcomes. While educators have known for a long time that student engagement matters, empirical evidence is now identifying the important aspects of teaching practice that lead to high engagement: setting challenging learning goals, improving teacher-student relationships, making teaching relevant, effectively using learning time and cultivating a positive learning climate.

Taken together, the factors associated with growth in HVA schools in the current study are consistent with those outlined in a recent review synthesising the evidence base on approaches to school improvement that are most likely to yield positive effects on student performance (CESE 2014a). This review outlined seven interconnected themes, including: encouraging a culture of high expectations, using explicit teaching strategies, giving students clear and effective feedback, using data to inform practice and decision making, using effective approaches to classroom management, promoting student wellbeing and engagement, and cultivating a collaborative school culture (CESE 2014a). As noted in this review, school success is most likely when these approaches are implemented at a whole-school level. The current findings, showing that each of these approaches was supported in the HVA school context, lends further support to the utility of these initiatives in facilitating school improvement across NSW.

While the intention of this study was to explore what some of the key drivers of high growth may have been in HVA schools, it is important to note some limitations.

First, since all potential drivers of school improvement in this study were analysed separately, it is not possible to determine the relative contribution that each of these factors makes to driving school improvement.

Second, qualitative interviews were only conducted at a sample of HVA schools, which makes it difficult to discern what changes took place in HVA schools that were not in place at control schools. Indeed, it is possible that some of the key drivers of change identified in interviews at HVA schools may also have been in place at control schools.

Third, for measures of teachers' perceptions of effective practice and student engagement, data was only available as a snapshot in 2014 and 2013 for a small subset of HVA and control schools, which prevented any analysis of trends in these measures over time. Future research examining the key drivers of change in HVA schools will benefit from examining important changes in these measures across an observed period of change.

Fourth, due to the relative nature of VA modelling²⁰, changes in VA scores over time can only be used to identify changes in school performance if certain assumptions are met, including that the relationships between relevant school/student-level contextual factors and student performance and the state average of schools' contribution to student growth both remain stable over time. Notwithstanding these assumptions, the VA approach remains the most robust approach to accurately and fairly measure real changes in school performance, particularly compared to measures of absolute growth or attainment.²¹

Fifth, the focus of all qualitative interviews was on factors that may have contributed to changes in literacy/numeracy because these were the outcomes upon which HVA schools were selected. While this is appropriate, it should be acknowledged that the drivers of improvement identified in this study might not be the same as drivers of other student learning outcomes. For example, it is possible that a different set of levers may need to be applied to create improvements in the other general capabilities set out in the Australian curriculum, such as critical and creative thinking or ICT literacy skills. This should be a focus for future research efforts.

Finally, the criteria applied to identify HVA schools focussed on examining schools which had shown high growth over a two-year period, which was sustained for an additional year. It is possible that the growth in the identified schools may not have been maintained into the future. However, this is an empirical question which future research, taking a longitudinal approach to monitoring changes in school performance, would benefit from investigating.

Notwithstanding these limitations, the current study provides an important contribution to the evidence-base on 'what works' to produce high growth schools. In summary, these schools tend to possess a positive institutional culture that emphasises and nurtures personal, academic and professional development and strong engagement among students, teachers and the leadership group. Supporting schools in NSW to cultivate these approaches may assist schools in maximising the contribution they can make to their students' learning.

20 That is, a school's VA score represents its contribution to student growth relative to the average contribution similar schools make to student growth over a given time period.

21 Further discussion comparing different approaches to estimating changes in school performance can be found here: http://cese.nsw.gov.au/images/stories/PDF/VAPaper_v3-1Final.pdf

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