Development of a school funding model for Western Australian public schools

Report on funding and options

Prepared for the

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by

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Executive Summary

Every child in Western Australia deserves the opportunity of an excellent education, irrespective of where they are living and what background they are from. It is with this in mind that the Department of Education commissioned a review of school funding to report on what is the best model for resourcing schools so that they can deliver a quality education that meets the needs of all students. The Department recognized that a key to creating the best possible environment is to empower schools to better respond to local needs and circumstances. Through increased autonomy, schools are better placed to deliver success for students across all settings. This means that the funding review needed to give consideration to identifying the best way of linking school funding with student needs and ensuring that enhanced autonomy in decision-making would be supported by appropriate funding arrangements.

The Western Australian funding review has been undertaken at a time when funding for schools across Australia is the subject of a national review, chaired by David Gonksi. The concerns of the Western Australian review relate to the ways in which resources are delivered to public schools and the patterns of resource allocation within these schools. These are considered within the context of achievement patterns. There is thus a somewhat different focus from the national review, though both could be said to be concerned with the same basic issue "to build the strongest possible platform for long-term investment and improvements in educational outcomes", to quote from the press release announcing the delivery to government of the final Gonski report (DEEWR 2012).

For many years, government in Western Australia has sought to deliver equitable resourcing across a large and very diverse jurisdiction. Adjustments to staffing formula and many special purpose lines of funding have tackled problems of low performance and educational disadvantage. Many piecemeal changes have been made to a system of resource allocation which is now excessively complex and has exhausted its capacity.

It is very doubtful whether the big achievement challenges that Western Australia faces can be effectively addressed without significant reform, firstly to school management and autonomy (such as is currently taking place through the Independent Public Schools initiative), and secondly to the funding model itself, which should be designed to support autonomy.

The achievement challenges include large and persistent gaps between schools and large differences in the progress of students over stages of schooling. Performance differences between schools are largely a function of differences in intake, and funding arrangements are not providing schools with the resource flexibility to weaken the link between student achievement and student characteristics. This means that resources are not being used to best effect. The most efficient and equitable use of resources is made when performance differences between schools at any given stage of schooling are minimized referred to in this report as *horizontal efficiency* and when the readiness of students to progress across stages of schooling is maximized (*vertical efficiency*).

The review methodology

The review was undertaken by the Centre for Research on Education Systems at the University of Melbourne and was conducted over three main stages. Stage 1 examined the performance profile of Western Australian public schools, using a range of cognitive and non-cognitive measures. These included NAPLAN results, attendance, indigenous attendance, school completion to Years 11 and 12, transition to education and training, and transition to employment.

Besides providing an overview of achievement patterns and of the impact of key influential factors (such as socio-economic status, indigenous status, and locality), this analysis also enabled the researchers to select a sample of schools for intensive study. By controlling for factors such as SES, indigeneity, locality and school size, schools were identified which were performing (a) well above expectation, (b) at benchmark, and (c) well below expectation.

A structured sample of 82 schools (mainstream and education support) was chosen, representing these different performance profiles. Intensive study of the resource allocation patterns in this sample of schools was the purpose of Stage 2 of the review. Schools were selected to ensure wide coverage based on school type (primary, senior high, district, remote, community), location (metropolitan, rural, remote), students and community (level of student and family disadvantage), and school performance (measured using a range of indicators such as TEE/WACE, attendance, retention, transition, completion, NAPLAN). The information collected from the fieldwork provided an accurate view of how schools use their resources. It allowed the researchers to look at resources across different school settings and in the context of what schools achieve, after taking account of student characteristics. Data were gathered on staffing allocations and salary costs across year-levels. The information was verified with the sample schools to create a robust database to investigate patterns of resource allocation

and to determine whether these patterns differed according to the performance profile of a school.

In addition, school leaders in all schools in the sample survey completed an online questionnaire. This covered areas such as major teaching and learning challenges faced by a school, funding issues, factors affecting student learning and school performance, current funding arrangements, staffing issues, and community relations.

Stage 3 of the review extended the online survey to all public schools across Western Australia. The purpose was to provide school principals with the opportunity to comment on the challenges that their schools faced, the funding issues, and their judgements about ways forward. Over 300 principals completed this questionnaire and provided a rich array of perceptions and reflections on school performance and school funding.

What the research says

Internationally there is a range of approaches to designing resource models to create more effective and equitable schooling. Within Australia, all systems provide more resources to secondary than primary schools. But the gap in funding is greatest in Western Australia. Student-staff ratios in public secondary schools in Western Australia represent a resource advantage of 38% over public primary schools as compared to only 14% in South Australia. Different weightings for primary and secondary students reflect different philosophies. However, these are rarely set out in a formal rationale and owe more to historical practice than informed policy debate.

School systems overseas also display a range of practice. For example, within the USA, some systems weight primary and secondary students equally, others place an emphasis on secondary, still others on primary. The states that have placed the emphasis on younger children reflect a growing body of evidence that early and sustained intervention is needed to ensure that all students make good progress through school and beyond.

Elsewhere in OECD countries a variable pattern of resource allocation between primary and secondary schools can be found. In some European countries, there is a large gap favouring secondary school students, e.g., France. This is not necessarily associated with better performance on international measures of student achievement, such as PISA. In other countries, the emphasis is placed on lower secondary, as in Finland. This report provides more detail about these different approaches.

Key findings

Public schools in Western Australia serve diverse populations

The population profile of public schools in Western Australia is very broad and on a number of dimensions is distinctive. Every twelfth student attending a public school in the state is indigenous. Every third student in a remote or very remote area in Australia is enrolled in a public school in Western Australia. There are proportionately three times as many students in remote settings in the state as in Australia as a whole. In socio-economic terms, the population of public schools in Western Australia is very diverse, and the proportion of low SES students in the state is higher than in Australia as a whole. These different dimensions of population diversity have implications for the comparative performance of the public school system of Western Australia.

National measures of school performance (NAPLAN) show gaps in how well public schools in Western Australia perform as compared with other systems. But these gaps greatly contract once population characteristics are taken into account.

In Western Australia as elsewhere in Australia, there are marked patterns of socio-economic and indigenous disadvantage in school performance. These strong associations are documented in this report. They reflect both individual characteristics and the concentration of multiple disadvantage in schools serving poorer communities. The size and persistence of these patterns imposes demands on funding arrangements funding must not only be equitable in treating all schools fairly, but structured to enable schools to effectively tackle disadvantage.

Schools would like more resource flexibility

Funding should be provided in way which gives schools flexibility to target student needs, set priorities, and vary the resource effort across different programs and interventions. Lack of flexibility to respond to teaching and learning challenges, to build teaching and leadership capacity in school, and to forge more effective relationships with the local community is a major concern reported by principals.

Why is flexibility important? *"More flexibility would allow me to provide more appropriate programs"*, one principal argues. Another writes,*"Flexibility with funding provides the opportunity for schools to target funding to the areas of need in the school. This supports individuals and cohort progress and achievement"*. This is echoed by other principals *"Greater flexibility to respond to student needs"*.

Current funding arrangements address need, but have reached the limits of their effectiveness

Funding for public schools in Western Australia addresses the objectives of fairness and equity, and is designed around need. Students at different year-levels receive different levels of funding both as between primary and secondary school, and within each level of schooling and students with specific characteristics receive additional support. However, the adjustments that are made for year-level and student characteristics are complex, they lack a clear and compelling rationale, and at a technical level have weaknesses which need to be addressed. The adjustments do not deliver a consistent pattern of resource outcomes to schools, and arrangements lack transparency.

The current funding model is focused on equitable provision of resources: this emphasis needs to change if schools are to deliver better and more equitable outcomes to students. The Independent Public Schools initiative is equipping schools with the autonomy they need to respond effectively to teaching and learning challenges, but the funding model is not supporting this. Principals comment that the current funding model does not treat all schools equally well and is hard to understand or follow. They point to the fact that staffing is budgeted in terms of positions rather than actual costs, and this creates anomalies between schools.

Principals also point to the insensitivity of the current model to the varying needs of students across schools. They express frustration about the numerous strands of funding tied to special purpose programs that give them little discretion or flexibility in using resources in the best possible ways for their schools. This is because the existing funding model focuses on inputs and allocates resources on the basis of historical operating costs. Attention needs to turn to outputs (e.g., the outcomes for students, including achievement, engagement, attendance, school completion).This involves an important shift in focus from providing inputs according to a staffing formula to looking at the resources needed to achieve good results. This in turn implies adjusting resource levels to what it costs to make a difference to different groups of students.

The current stage weights are not supported by principals

Funding models not only treat primary and secondary students differently, but also students at different year-levels *within* primary and secondary school. This is the case in Western Australia. In primary school, enrolments are multiplied by weights ranging from a low of 1.10 for Year 7 to a high of 1.50 (per FTE) for Kindergarten. This pattern is a reverse hierarchy, with students in the highest year-level receiving the smallest adjustment, and students in the lowest year-level receiving the highest adjustment. By

contrast, the enrolment weights in secondary school represent a hierarchy rising from a low of 1.39 in Year 8 to 1.77 (Year 11) and 1.76 (Year 12).

These year-level adjustments reflect changing historical practice. Traditionally more resources per student have been applied to secondary schools in light of constraints such as the-often small number of students completing school and the consequentially smaller size of specialist classes in the final years. Other factors come into play, such as the administrative costs associated with faculty structures and specialist roles. More recently has come the recognition that early investment in school pays off in the longer term. Acting on this view, governments have structured primary school resources in the reverse hierarchy observed in the case of Western Australia. But together these two patterns are difficult to reconcile in any coherent policy argument. If it makes sense to invest early in primary, it makes equal sense to invest early in secondary. If students are to have a wide choice of activities and study opportunities in upper secondary school, they can scarcely have fewer in lower secondary or upper primary, when engagement is critical.

These tensions in how to allocate staffing resources to primary and secondary school, and to different year-levels within primary and secondary school are reflected in the comments of principals both in the sample survey and the statewide survey. Most primary school principals want to see a bigger effort in the upper primary years. This is consistent with the emerging emphasis in educational research on sustaining early intervention rather than lowering support or providing fewer resources. Many also want to see improved resourcing in the lower secondary years. Secondary school principals recognize the higher relative costs of small specialist classes, but many also see the importance of building a strong platform of achievement early in secondary school, thus promoting high rates of school completion and full classes in upper secondary programs. They extend this view to the upper primary years. Senior high school principals whose schools serve poorer communities are more likely than others to place an emphasis on the middle years. The middle years thus bring together primary school principals and senior high school principals leading schools with significant disadvantage.

While the Western Australian funding model allocates resources according to a certain pattern, schools are able up to a point to adapt this pattern in the way they allocate resources to students. The sample survey of 82 schools looked closely at resource allocation patterns. Do all primary schools allocate staffing across year-levels in the same way? Is this also true in senior high schools? Or are there differences, and are these differences associated with higher or lower performance?

Current approach to applying stage weights in combination with student and institutional multipliers enhance disparities

The resource differences between primary and secondary schools, and within both primary and secondary schooling in Western Australia are not simply the result of different year-level multipliers. Year-level weights are applied to enrolments which have already been adjusted for student characteristics. The current practice of multiplying year-level weights against the weighted enrolments which have been adjusted for student and school characteristics intensifies differences in quantities of resources available to schools serving the same students.

For example, a student with an identified educational need level of 4 (EN4) is treated as the equivalent of 3.3 (3×1.1) students for staffing allocations at Year 7, but is treated as 5.3 (3×1.771) students at Year 11. As another example, schools are provided with a 10 per cent loading for VETiS. However, the loading is also multiplied against the year-level weight so that relative to a Year 7 student, the VETiS supplementation is actually closer to 17 per cent, not 10 per cent. In effect, weights are multiplied against weights which can vary the levels of resources in unintended ways.

High performing schools use their resources in very strategic ways

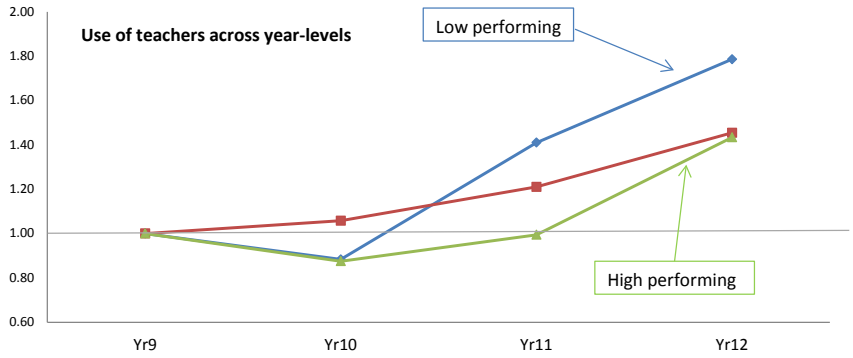
Public schools in Western Australia that perform well above benchmark standards above what would be predicted given their students display a strategic approach to their use of resources. Approaches include school-wide literacy and numeracy strategies, student engagement programs, targeted literacy support, mentoring of teachers, smaller class sizes in junior year-levels and targeted use of professional learning.

But it is their strategic use of teachers that sets them apart. In primary schools this means investing early and spreading experience and number of teachers fairly evenly. For example, the numbers of teachers to students are fairly even from Years 4 to 7 in high performing schools, but tend to be uneven in poorer-performing schools, rising in the later years. In senior high schools it means taking an approach to teacher allotments in which experienced teachers are employed across year-levels. In some schools, an additional teacher is employed in Years 8 and 9 to create smaller classes and manage the needs of students at-risk.

There is an understanding at these schools that investment of teachers in the early year-levels, as well as the higher, helps promote better outcomes. On average, the successful senior high schools use the same number of teachers in Years 9 and 10 as they do in Year 11. Schools generally have to use proportionately more teachers in Year 12 because of the smaller cohort, though in high performing schools this is contained. For example, at

one such small to mid-size school with 525 students, teaching resources are fairly evenly spread across years 9 to 11 and it is only in Year 12 that there is a higher relative allocation (1.18 FTE against 1.0 FTE in Year 9).

However, some schools that are not performing well, have a different approach to staffing. For example, a larger senior high school with almost 1,000 students performing well below what might be expected across a range of indicators, including NAPLAN, allocates 1.55 teachers in Year 12 and 1.2 teachers in Year 11 to every teacher in Year 9.



Equity funding could be better targeted

There has long been recognition that schools serving disadvantaged communities need additional support, and the funding model is structured to achieve this. However, marked social patterns of school performance raise a number of questions about impact and distribution of support. Is the level of additional resources and support given to schools serving disadvantaged communities big enough to improve performance? Are the resources available spread too thinly at present to respond more effectively to the challenge of under-achievement in disadvantaged settings? Are the additional resources being targeted in the best manner? And are the resources being used as effectively as possible?

Analysis of growth in NAPLAN gain scores shows that students in the most disadvantaged schools (those in the bottom 20 per cent as measured by SEI) start behind others and fall further behind as they ascend school. The funding strategy is not working to prevent this. If the goal of SES-linked funding is to neutralize the effects of socio-economic status on student achievement, the results suggest that this is not yet happening well enough.

To get the best results from supplementary funding requires appropriate targeting of support. Currently the Western Australian public school system uses a composite index

of disadvantage the Socioeconomic Index for Schools (or SEI). The SEI, like the ICSEA (used in NAPLAN reporting), is a measure that strongly correlates with student performance. Yet it may not be the best measure with which to target funding.

SEI is a composite measure based on income, indigenous status, family structure, education and occupation. As with all such omnibus measures, it runs the risk that it does not adequately address the areas of individual need. For example, there are quite a few schools in WA which score highly on the SEI scale (well over 100) where most parents have very little education themselves (low attainment) and are in low status occupations or unemployed. Also there are a few schools with an indigenous student population of more than 20 per cent which do not receive additional staffing through the SEI component of the staffing allocation formulas. The issue is about how best to target needs of different groups of disadvantaged students. If the SEI scale is meant to target socio-economic disadvantage, and if funding for indigenous students, high mobility students and students in rural and remote locations can be targeted more directly based on actual location and numbers, then it may be appropriate to allocate the resources more directly for socio-economic disadvantage, using a simpler index based on student characteristics.

It is important to stress, nonetheless, that some schools with large numbers of disadvantaged students are high performing schools. They are doing much better than could be predicted, given student characteristics. They have used additional resources to good effect. One such senior high school with reading, writing and spelling NAPLAN scores at least 15 points above the state average uses its SSPRA funds to employ a literacy specialist, and has in place an advisory program with mentoring for at-risk students in Years 9 and 10. It also offers learning support for students and an off-site engagement program for students in Years 11 and 12. Another school with almost 20 per cent of indigenous students and an SEI close to 90, was just under the NAPLAN state average in Year 9 numeracy in 2010 and pointed to its use of additional teachers in Years 8 and 9 to create smaller classes, a heavy focus on classroom management strategies (through PD) and intensive work with other schools.

Used well, equity funding can deliver results.

Schools with small enrolments are limited in the way they can use their resources

Some schools have declining enrolments, related to changing population, parental perceptions and competition. By-passed by aspirant families and having to deal with residualized concentrations of disadvantaged students, such schools are forced to offer very small classes in the senior years. This multiplies costs and drains resources from

other year-levels where they are needed (as can be seen in the chart below). A funding model alone cannot deal with this problem, which requires broader policies on provision, but nor should the model reflect it with inflated senior-year loadings.

A new model

Key goals of a new funding model should be to provide schools with flexibility in planning and resource deployment, and the capacity to address differences in student needs. Different students have different educational needs, and funding levels should reflect those needs as best as possible. To promote high quality outcomes for all means having an appropriate mechanism of needs-based funding. The formula arrangements therefore need to be responsive to context. This means that they must be capable of reflecting differences in the circumstances of individual schools and in their student population and community. School leaders are best positioned to decide how to improve achievement in their school and the budgets should be designed to promote this.

Under the current Western Australian funding model, input formulas are used to calculate staffing (teaching and school support) allocations based on the number of students enrolled (influenced by specified student-staff ratios connected with stages of schooling), as well as additional funding for specific programs and supplies. Attention needs to turn to outputs (e.g., what schools produce, such as types of achievement) and outcomes taking account of student characteristics.

A student centred formula is proposed which allocates funding based on student characteristics at the school. The student centred formula allocates core funding on a per capita basis adjusted for school characteristics and with per capita supplements for equity components. It is designed to give schools more decision-making authority and to give students more equitable distribution of resources.

Consideration is given to each student according to education needs: students who require greater resources such as low-SES students, indigenous students, students in rural and remote locations, English language learner students, and students with disabilities.
This model provides a more equitable distribution of resources by correlating school funding with the specific needs of students at the school. In addition, schools gain autonomy in developing their own teaching and learning approaches and corresponding budgets.

The key features of the model are:

1. Core funding is delivered through a uniform price per student.
2. A separate base allocation is made to schools to cover minimum running costs. The base is enrolment-tapered.
3. Geographical isolation and small size constraints are addressed through separate and specific additional lines of funding.
4. Socio-economic disadvantage is tackled through an allocation based on density or relative concentration of students from low SES backgrounds, derived from information relating to individual students, not area characteristics. Education and occupation of parents are the relevant characteristics, and a suitable scale is constructed from these characteristics. Composite and area-based measures are not used.
5. Indigenous funding is consolidated into a single targeted line.
6. Disability, ESL and refugee funding is delivered through three separate lines, each involving clinically or pedagogically-assessed need. For each group, individual assessments are required, and support is scaled accordingly.

The funding model directly targets the needs of every student. In doing so, it tackles the large differences in performance between schools that currently reflect the large differences in student intakes. By treating similar students in the same way, the model is far more equitable than at present, as similar students will attract the same level of funds. The model also recognizes that students differ in the level of their need, and provides additional resources to students with greater educational needs.

Transition to a new funding model

Simplicity and transparency are major features of the model as is flexibility for schools in deciding how resources are allocated to students.

Moving to this new approach will require a phased process to enable schools to adjust to an environment in which they have new responsibilities, but also greater freedom of action.

It will be important to ensure that principals are well-prepared and supported to manage the transition and to take full advantage of the flexibilities delivered by the new model. Principals accept the need for change, but they also need time to adjust.

1. Introduction

The Western Australian government is committed to maintaining a system of successful public schools that delivers high quality teaching and learning to improve the life chances of all children and young people. To achieve this goal, the *Classroom First Strategy* sets out a comprehensive set of actions to be undertaken both by those within schools and by those outside schools to support high quality classroom teaching. It recognises that the role of the central and regional offices is to create the best possible environment for effective leadership and teaching in schools, and for raising the achievement of all students irrespective of background and location.

A key to creating the best possible environment is to empower schools to better respond to local needs and circumstances. Through increased autonomy schools are better placed to deliver success for students across all settings. To pursue this goal, the Western Australian Department of Education (the Department) commissioned a review of school funding. This review is to provide advice on preferred school resourcing models to support schools so that they can operate with increased autonomy to deliver success for students from all backgrounds. The review is being conducted by the Centre for Research on Education Systems at the University of Melbourne.

One of the tasks of the review is to study how the resources allocated to Western Australian public schools through the staffing formula, school grant mechanism and special programs are used by schools, and how patterns of resource use are linked to student outcomes. To do this there was an intensive survey of resource use in a range of schools across the state. The information collected from the fieldwork is designed to provide an empirical view of how schools use their resources, to see how patterns vary by location of school, how allocations and costs differ according to year-level, and to view these differences in the context of what schools achieve, after taking account of student characteristics.

This report presents the main findings from the survey of schools. It begins by outlining the research tasks undertaken, the method used to select schools for the fieldwork, and the approach taken to collecting data. Following this are four separate sections which reflect on different aspects of funding and school performance. The first three sections present information on some of the different funding programs or elements designed to give schools the resources needed for quality service provision to promote high standards of learning and outcomes for all students. This includes an analysis of equity funding and

the relative emphasis placed on the different stages of learning. Chapter Five of this report outlines a model for improving resource allocation, drawing on the analysis in different stages of the research program.

Importance of the review

In recent decades, the trend within Australia and in other OECD countries has been to reduce the involvement of the centre in the day-to-day operations of schools, to decentralize educational administration and to give schools greater responsibility and authority over school planning and decision-making (OECD, 2006).A key element of greater school autonomy is control over all resources, including human resources. This is recognized in the Independent Public Schools (IPS) initiative in which schools are free to determine their own staffing profile and to recruit their own staff.

Public schools have been encouraged to accept increased autonomy aimed at improving the quality and responsiveness of local decision-making and hence the quality of the education provided to students. A key feature of the move towards a more devolved system of self-managing schools in other jurisdictions, both here in Australia and in many other OECD nations, is the development and implementation of school-based funding models which place control of financial resources at the individual school level.

The IPS initiative is designed to deliver greater authority to schools in deciding how resources are to be managed and greater say over the recruitment of teachers and other staff. The initiative reflects the growing interest of governments in empowering schools to manage their own resources, because principals and school communities are best placed to understand their own needs and decide on how best to deploy resources. For public schools in Western Australia, funding involves central management of major budgeting and financial operations, the use of line-item budgets to identify and account for expenditures, and the use of global staffing formulas to determine the allocation of the main item in school budgets, namely teaching staff. Staffing allocations to schools continue to be centrally administered, as are many of the program-specific school budget items, except in respect of Independent Public Schools which enjoy a degree of flexibility through a one-line budget and which operate outside of central staffing processes.

Over time, schools have been given greater control over budgets for some non-salary operating costs. For example, the introduction of the *School Support Programs Resources Allocation* (SSPRA) pooled a number of separate budget items (such as funding for the Behaviour Management Discipline Strategy, the Learning Support Program, and the Literacy and Numeracy program) into a single item, giving schools

greater scope for exercising control over how the funds are used. It is this type of flexibility in allocating funds at a local level that principals point to as important improvements: “the SSPRA funding allocation with its flexibility has been terrific as it has allowed us to better target local needs” (Principal, Provincial Senior High School).

The Department’s *Classroom First Strategy* aims to support schools and teachers in ways that help improve both the educational experiences and the results of students. In this way it places the student at the centre of thinking about school resources, management and delivery. Included in the strategy is a focus on providing schools with greater autonomy in managing their resources to better build capacity in schools. The plan will help support schools to achieve Western Australia’s goals of (1) success for all through a focus on student achievement, (2) effective teaching in all classrooms, (3) tailored delivery and programs responsive to local context and needs, (4) targeted and relevant teacher professional development designed around local school needs, (5) enhanced mechanisms of accountability, and (6) building public confidence and trust in the quality of public schools.

A key focus in the goals is a commitment to establishing the provision of schooling in a way that promotes strong educational outcomes for all students. Resource allocation needs to be examined, reviewed and developed in a way consistent with this focus. The aim of school funding is to ensure that all students attending public schools in Western Australia have access to a level of resources which enables them to achieve a high standard of learning and to extend their involvement in education or training well beyond the compulsory years.

To do this, resource allocation needs an outcomes focus. This involves an important shift in focus from providing inputs according to a staffing formula and school grant to looking at the resources needed to have good outcomes. And this implies considering the way resources are used to achieve good outcomes for different student groups. While public schools work well in Western Australia, they also work under very different conditions and enrol students from a wide range of backgrounds, depending on location. A resource allocation mechanism needs to ensure that funding is targeted to match equity challenges, so that no student is disadvantaged.

It is recognized that quantity of resources alone is not sufficient to improve achievement standards, and that there are important issues of quality that must be addressed. Programs, interventions, curricular emphasis, quality of teaching and quality of leadership are important elements of school performance. Schools will need to play a very active role in identifying and developing interventions and strategies for

improvement. How resources are deployed in schools, and not only their quantity, is an important issue.

Method for the review

The review of models of funding in Western Australian schools required a range of research tasks.

The first was a study of school performance and the various factors that affect student learning and student outcomes in different school contexts. For this task, data for the 762 government primary, senior high, district, remote, education support and combined schools were collated and analysed to look at differences in student performance across a range of indicators. The indicators included:

Cognitive

- Year 5 NAPLAN reading, writing, grammar, spelling and numeracy results
- Year 7 NAPLAN reading, writing, grammar, spelling and numeracy results
- Year 9 NAPLAN reading, writing, grammar, spelling and numeracy results
- Tertiary entry scores

Non-cognitive

- Attendance rates
- Indigenous attendance
- Retention (Year 11, Year 12)
- Transition to education and training
- Transition to work

Data on student learning, student engagement and student outcomes provide important information about the effectiveness of a school for example, the proportion achieving at national benchmarks or better on the various NAPLAN dimensions in Year 7, and the attendance rates across this phase, help indicate to us how many students at the school are well prepared for the next stage of their education in terms of both their engagement in school and their achievement. When comparing the performance of schools we must also recognise that students will have different starting points, face different challenges, come from different backgrounds and that the proportions of students with specified levels of literacy and numeracy skills at the starting point will vary from school to school. Simple 'raw' measures of achievement and other progress indicators, therefore, are not an adequate measure of a school's performance; they need to be adjusted for student

characteristics and school context. To do this requires using an appropriate statistical procedure and appropriate controls for factors that are beyond the school's immediate influence. Regression analysis was applied for this purpose in the current study using a set of controls for student characteristics and school context that included:

- measures of the school's academic composition (Year 3 and Year 7 NAPLAN results)
- measures of the school's socio-economic intake (captured by SEI)
- the proportion of students receiving disability funding
- the proportion of Indigenous students
- the proportion of ESL students
- the proportion of students from Language Backgrounds Other than English
- the school's rurality (ARIA scores), and
- the school size (FTE enrolments).

The intake-adjusted school performance analysis gives the fairest possible indicator of the effectiveness of a school and the best possible basis for comparisons.

The reason for undertaking an analysis of school performance was to provide a foundation to the selection of a sample of schools that could be used to study resource expenditure patterns. A key aim was to establish how high performing schools use their resources relative to other schools. From the intake-adjusted performance analysis schools were grouped into three categories according to their aggregate performance against the range of performance indicators: (1) schools that were identified as performing above what would be predicted based on their intake and context (several standard deviations above what would be expected), (2) schools that were at benchmark standards of performance (performing at predicted levels given intake and context), and (3) schools performing well below what would be predicted based on student characteristics and context (several standard deviations below what would be predicted).

The second key task for the current work was to examine the expenditure patterns in a range of schools. How do schools use the funds they have available and is the use of funds linked to differences in performance and student outcomes? The main goal here was to look at how effective and improving schools are using their resources and to identify if there are differences in patterns of use with other schools. To do this required a survey of schools selected to reflect different categories and performance. A sample of 82 schools was selected taking account of school type (primary, senior high, district, remote, community), location (metropolitan, non-metropolitan), social intake (SES

composition of student intake based on SEI), and school performance (measured across the range of cognitive and non-cognitive indicators of school performance).

In terms of school performance, schools were selected from each of the three categories of performance at benchmark standards, well above predicted levels, well below predicted levels to compare any relationships between resource-use and performance. In addition, eight education support centres were included to ensure resource expenditure information was available on all of the various types of public schools in Western Australia.

The final sample of schools according to school type and performance is shown in Table 1.1.

Table 1.1 Sample size, by school type and performance

	Intake-adjusted school performance			
	Well below (Low)	At Benchmark (Strong)	Well Above (High)	Total
School type				
Primary	10	14	11	35
Senior High School	4	15	9	28
District High School	1	6	2	9
Remote Community School	1		1	2
Education Support Centres/Schools				8
Total	16	35	23	82

For the second task it was important to obtain accurate information on how schools use their resources. To do this, data were collected in two stages. At the first stage, the Department provided extensive information on school payroll and school budget expenditure for 2010. Salary expenditures were itemised by staff member (school employees) and staff category (teaching, CPSU, education assistants, education support, cleaners and gardeners). Participating schools were then contacted and asked to provide information on timetables and teacher allotments for the 2010 calendar year. From this information it was possible to allocate teacher time across classes and year-levels. The focus was on identifying the proportions of each staff member's time that was allocated to each year-level in 2010. One of the aims was to estimate what resources are used at different year-levels in order to look at cost variations across phases of schooling.

The second stage of data collection involved surveying the 82 schools. This took place in several steps. First, schools completed an on-line survey answering a range of questions

on resource use, funding and school context. Items covered in the survey included views on:

- major challenges your school faces in terms of teaching and learning
- main issues for your school in relation to funding
- factors that have the greatest impact on student learning at your school
- funding for different stages of learning
- current school funding formulas
- staffing issues for the school
- factors affecting learning and school performance
- links with the community

Second, interviews were held with school leaders (usually the principal and sometimes other members of school leadership teams) of the 82 schools. Some of the interviews were undertaken by phone and some (20) involved site visits. This took place in the second term of 2011. The interviews and visits served a number of purposes, most importantly to confirm with schools that the resource expenditure patterns profiled from reconciling the initial school data with the financial information provided by the Department were accurate. This helped clarify anomalies, identify non-classroom duties for various staff members and obtain estimates of the proportions of time associated with the duties employed across different year-levels. The interviews were also used to collect information more broadly on school programs and features that schools identify as being particularly effective in promoting quality outcomes, and to seek school views on major issues related to resource allocation affecting schools.

At the completion of both stages of data collection, a consolidated data set was created which contained aggregated information on allocations and use of staffing at each school, and expenditure on non-salary items. Staff-salary related expenditure was grouped into five categories: (1) classroom teaching, the resources associated with timetabled teacher allotments, (2) teacher duties other than teaching, (3) classroom support provided by education assistants (other than special needs), and (4) non-classroom staffing, which covered administrative staff, school officers, business managers, library staff, cleaners and gardeners, and other ancillary staff.

Two types of resources data were applied to every expenditure item. The first was the actual cost in dollars, as measured by salaries. The second was the quantity of resources used, not in dollars, but in the actual number of staff.

Analysis

Once all data on resource allocation in the 82 schools were verified, the quantity of teaching resources and the costs at each year-level were analysed. The relative costs per student give an empirical view of how schooling is resourced at different year-levels in different schools, and what patterns of resource use are associated with better student outcomes.

The analysis of expenditure focuses on stages of learning and equity funding because these are key resource drivers in the current allocation mechanisms, and they are also critical to ensuring schools receive appropriate levels of resources to meet the needs of students, which vary depending on community context and level of schooling. It is important to note that how schools use resources currently is likely to reflect the historical role of the current funding formulas. The expectations for funding formulas based on the current model have been that they should distribute funding equally in terms of the 'inputs' or the resources that should be made available to each school, adjusted for student and school characteristics. The review needs to consider models which move from input to outcome, i.e. is the funding that a formula distributes adequate to not only ensure schools have available sufficient resources for delivery of schooling but ensure that the resources produce at least equality of opportunity and, ideally, equality of result? This expectation requires a more sophisticated understanding of the inputs to education that lead to student achievement and success. The analysis will also consider these aspects in the review of resource use in schools.

A third major task was to implement an online survey of all school principals across Western Australia. This was seen as important in tapping into the insights and experience of many different educational leaders with close familiarity with school funding. The survey was an opportunity to hear from principals regarding the teaching and learning challenges that their schools faced, and to see resourcing within this context. Principals were invited to comment on funding arrangements from their own situational perspective (but also more broadly on the basis of their professional experience) and to flag desirable directions of change. A large cross-section of principals took up the opportunity and provided valuable information and commentary 192 primary school principals, 34 district high school principals, 51 senior high school principals and a further 34 principals from community colleges, agricultural colleges, language development centres, remote community schools, education support centres and schools, and intensive English centres.

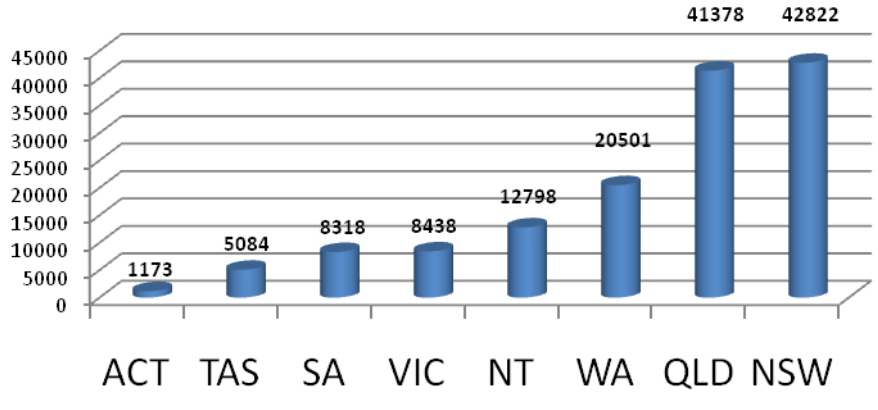
2. Challenges for schools

Introduction

There's no doubt that Western Australia faces some challenging circumstances in the delivery of government schooling. The performance of students in school is affected by a variety of factors. A substantial body of research, both local and international, demonstrates that differences in social and demographic contexts linked to socioeconomic status, isolation, and indigenous status have a marked impact on student outcomes (in Australia, see, for example, Lamb et al. 2004a, Lamb et al. 2004b, and for a major overseas study see Woessman, 2004). One of the strongest relationships between success at school and student background is that linked to indigenous status. Take, for example, recent national NAPLAN results on reading, writing and numeracy. The percentage of Year 3 students in the two lowest bands (at or below the national benchmark) of national achievement in reading in 2009 was 12.3 per cent (ACARA, 2009). The percentage for indigenous students was 48.2 per cent.

Compared to some other parts of Australia, Western Australia has a large number of indigenous students. Figure 2.1 shows that across states and territories, Western Australian public schools have the third largest number of indigenous enrolments (20,501). The numbers are much larger than in the Northern Territory. Approximately one in every 12 students in a government school in Western Australia is indigenous and given the relationship between indigenous status and academic achievement it means that public schools in Western Australia face considerable challenges in achieving agreed benchmark standards of learning.

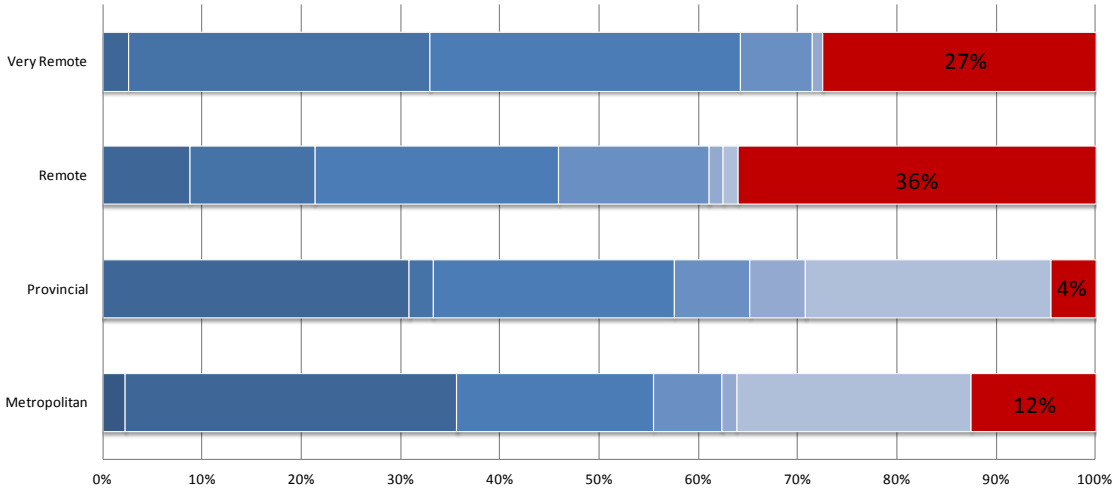
Figure 2.1 Indigenous enrolments by state and territory: public schools, 2010



Living in rural and isolated areas is often associated with educational disadvantage. Challenges posed by size, small and often declining enrolments and geographic location put rural schools at an economic and educational disadvantage, making it difficult to generate funding, recruit and retain teachers, and offer an extensive range of programs in the post-compulsory years. Effects on student participation and achievement have been highlighted in a range of studies. For example, in a study using PISA 2001 data, Williams (2005) examined cross-national variation in rural mathematics achievement among 15-year-olds in 24 industrialized nations including Australia. He found that rural mathematics scores were significantly lower than scores in urban and medium-size communities in Australia.

Figure 2.2 shows that every third government school student in a remote or very remote location across Australia is located in Western Australia.

Figure 2.2 Enrolments by remoteness location and state: public schools, 2010



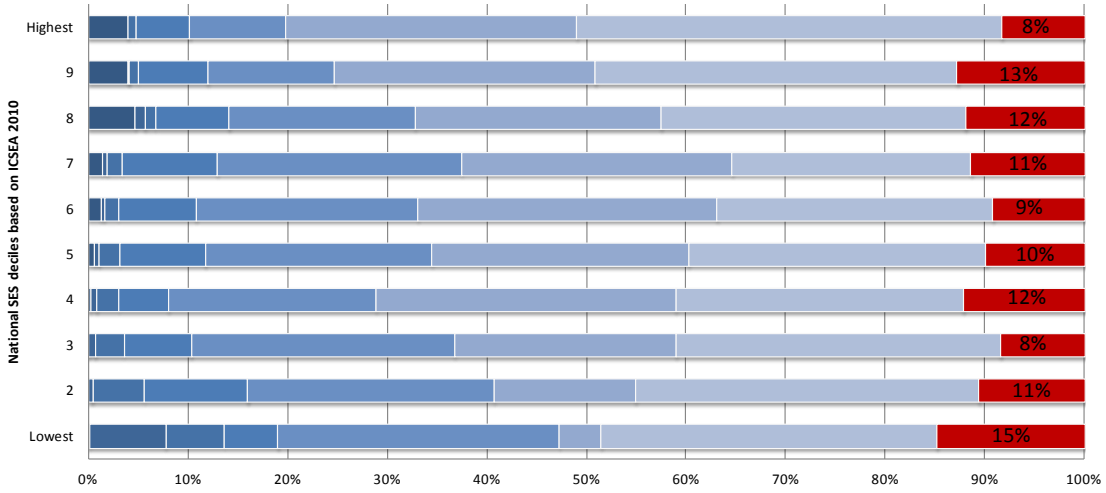
	Metropolitan	Provincial	Remote	Very Remote
ACT	38408	84	0	0
NSW	550336	188367	3615	699
NT	0	14568	5190	8020
QLD	326245	148066	10107	8238
SA	114460	46604	6237	1924
TAS	24074	33809	596	271
VIC	389196	150889	628	0
WA	206091	27049	14776	7255

Whereas, across Australia, only 2.9 per cent of government school enrolments are in remote or very remote locations, in Western Australia the rate is 8.6 per cent, highlighting that Western Australia carries a much larger burden than many other parts of Australia in delivering schooling to remote locations. There are large numbers of students in Western Australia who live in remote and very remote locations, which are also disadvantaged in socio-economic terms.

In addition to indigenous status and isolation, family social background also has a profound effect on educational achievement and outcomes. Many studies from here and overseas have consistently found that family background is one of the single most important contributors to a student's success in school (e.g. see Woessman, 2004; Lamb, 2011).

Figure 2.3 presents the distribution of government school students across Australia in terms of their social background. Students are grouped into deciles based on the Index of Community Socio-Educational Advantage (ICSEA) school scores. The patterns show that Western Australia has a fairly diverse SES composition, with students drawn fairly evenly from across the SES deciles. However, two points are worth noting. First, Western Australia has only 8 per cent of the nation's students from the highest SES decile while it has an 11 per cent share of all enrolments. Second, it has 15 per cent of all Australia's enrolments from the poorest backgrounds (lowest decile of SES) against the state share of 11 per cent of all enrolments.

Figure 2.3 Enrolments by SES deciles and state: public schools, 2010



	Lowest	2	3	4	5	6	7	8	9	Highest
ACT	308	0	92	589	1580	2972	3353	10963	9330	9305
NT	17813	1111	1661	1555	1079	812	1120	2210	400	0
TAS	13636	12053	6639	5131	4788	3325	3513	2406	1955	1780
SA	12448	23999	15587	11516	19631	18033	22142	17042	16313	12514
QLD	65560	57301	61003	48388	52346	51474	57035	43067	29615	22249
VIC	9809	32882	51391	69774	59157	69397	63031	56924	60988	67360
NSW	78155	79911	75277	67029	68649	64141	55788	70434	84557	98272
WA	34334	24485	19425	28186	22639	21218	26371	27477	29671	19105

This pattern suggests that some schools in Western Australia deal with large numbers of students from low SES families (34,334 students across the state are from the lowest decile of SES based on national parameters). It is important to remember that the strong link between social disadvantage and student progress is not only produced because of a direct impact of family background on individual student performance, but also through

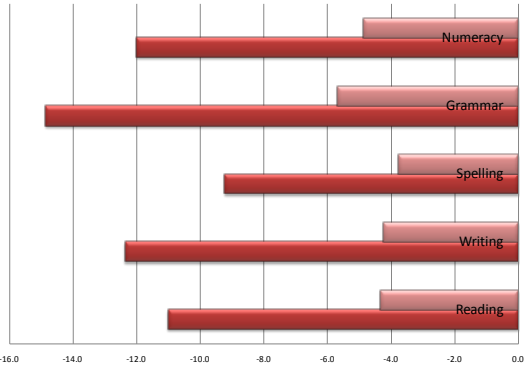
the effects on performance of schools in which there are high concentrations of students from disadvantaged backgrounds. There is a long line of studies, continued by recent research in the school effectiveness tradition, which shows that the composition of schools influences student outcomes (see, for example, Willms, 2001; Coleman et al. 1966). Once schools reach a certain density of disadvantaged students it has an impact on how they perform and impedes how well they can address the additional learning needs of students.

There are implications of the population challenges confronting Western Australia which need to be considered in the context of school funding. This section looks at the impact of these challenges on the performance of Western Australian schools in the context of resources.

School performance is affected by intake and context

When compared against national standards, it is clear that the population challenges that confront Western Australian public schools affect performance. Figure 2.4 shows the mean deviations of Year 5 NAPLAN scores from the national averages. On all dimensions reading, writing, spelling, numeracy and grammar and punctuation when population differences are taken into account (through the use of regression models that take account of SES using ICSEA, the percentage of indigenous students, remoteness, size of enrolments, and proportion of population from language backgrounds other than English) much of the gap between school results in Western Australia and the other states of Australia is removed.

Figure 2.4 Deviations from the national state averages in NAPLAN Year 5 mean scores: primary schools, Australian states, 2010



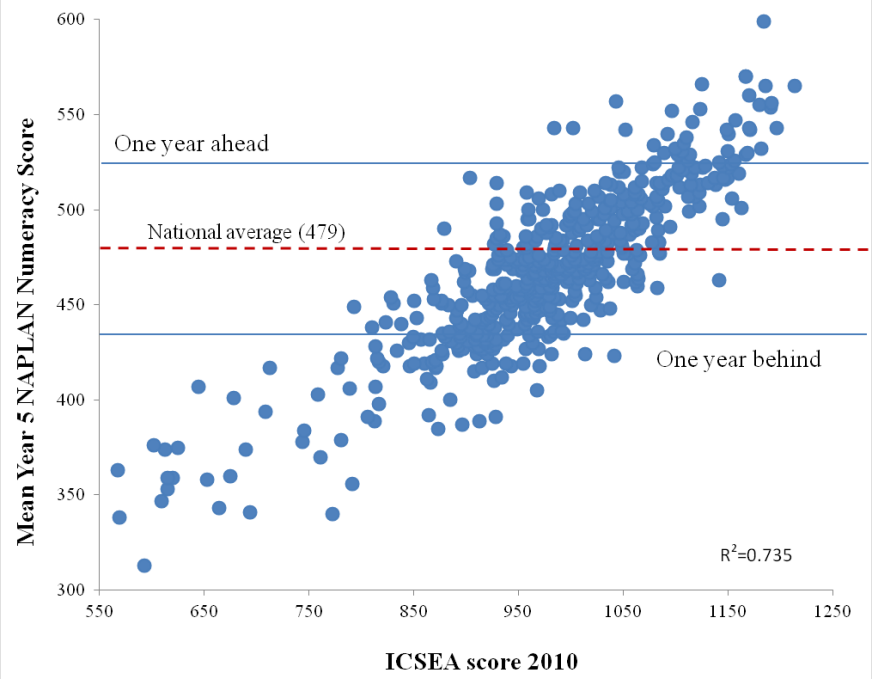
	Reading	Writing	Spelling	Grammar	Numeracy
Population adjusted score	-4.3	-4.2	-3.8	-5.7	-4.9
Raw score	-11.0	-12.4	-9.2	-14.9	-12.0

There are other indicators of schooling which show Western Australia is doing well by national standards. As one example, the 2010 attendance rates show that despite the high numbers of indigenous students, the rates of attendance almost equal the national average for both primary schools (93 per cent) and secondary schools (88 per cent).

Large diversity within the state, however, means that some students are not making enough progress and this is linked to their backgrounds and community and school contexts. Achievement is closely associated with socio-economic status, indigenous status, and location.

Figure 2.5 plots school mean Year 5 reading achievement score against ICSEA in 2010 for primary and combined schools. It shows that as ICSEA levels increase so do achievement scores. Some schools (mainly those with high ICSEA values) are at learning or achievement standards more than one year above the national average. There is a high correlation between the SES intake of schools and Year 5 numeracy achievement (0.858), meaning that the ICSEA measure alone accounts for 73.5 per cent of the variation across schools in Year 5 numeracy achievement. The social intake of schools as measured by ICSEA is strongly related to school performance.

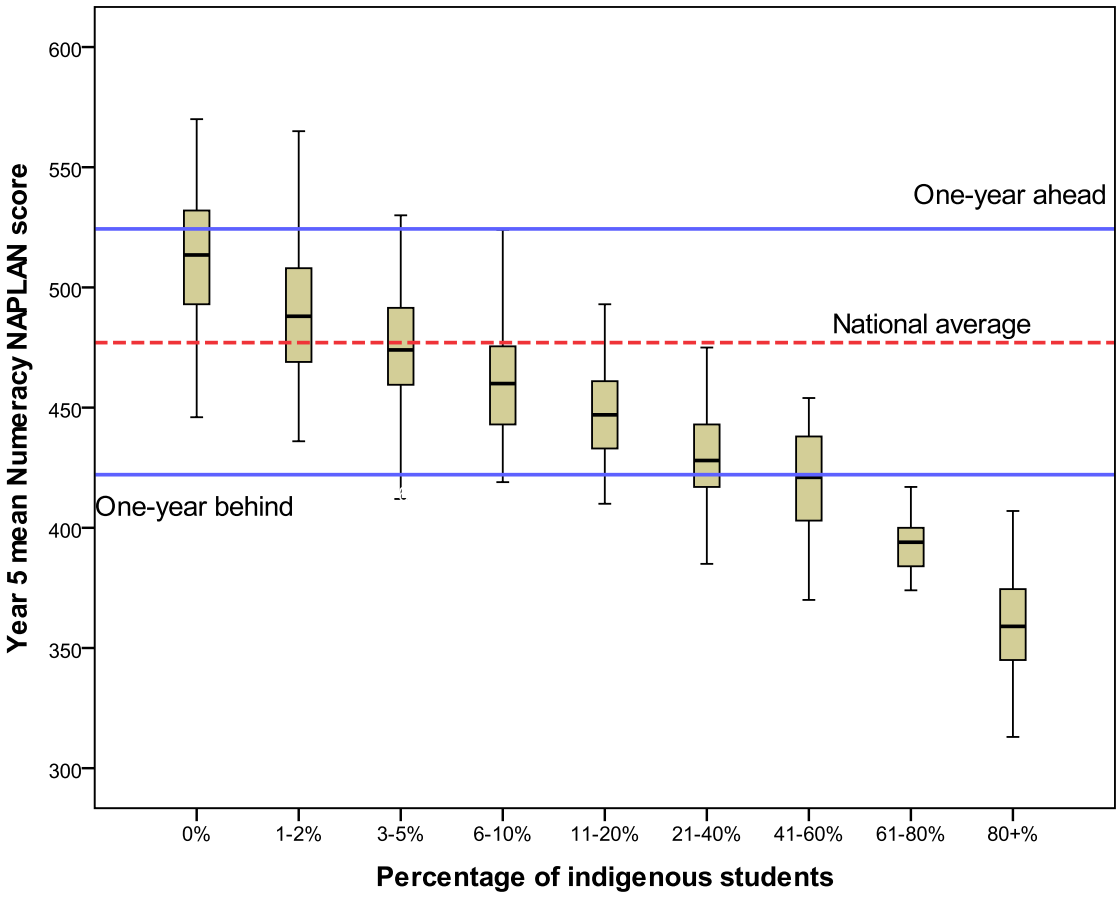
Figure 2.5 Year 5 numeracy achievement, by ICSEA: primary and combined schools



It is not only social intake as measured by ICSEA that is important to consider. There is also a close link between average achievement and numbers of students enrolled from indigenous families. The results from NAPLAN in 2010 show that at a national level achievement gaps between indigenous and non-indigenous students can be large, with indigenous students often up to one or more years behind in standards of learning (ACARA, 2010). The data for Western Australia are consistent with these national patterns.

Figure 2.6presents box plots of Year 5 numeracy achievement scores with schools grouped according to the concentrations of indigenous students(correlation=.706, R2=.498). Some schools have no indigenous students, while schools at the other end of the scale serve only or mainly indigenous students (80 per cent or more).

Figure 2.6 Year 5 numeracy achievement, by percentage of ATSI students



In general, as the percentages of indigenous students increase, achievement levels fall. Schools that do not have any indigenous students are performing, generally, at rates well above mean national standards. This is also true for schools with low enrolments (1 to 2 per cent). Schools with high concentrations of indigenous students more than 40 per cent are all performing below the national average and schools where more than 60 per cent of students are indigenous are all performing at a standard where students are more than one year behind. The patterns highlight the extent of the challenge for some schools in reaching even modest standards of achievement.

The concentrations of the different high need categories of students across schools are far from even. Some schools deal with multiple categories of need. As Table 2.1 shows, schools serving populations with high proportions of low SES students (as defined by quintiles of ICSEA scores) also have the largest concentrations of students from indigenous backgrounds. They also tend to be located in remote and very remote locations. While there is a spread of schools within metropolitan locations dealing with disadvantage, there is a much higher proportion in non-metropolitan locations. Conversely, there are few schools with a high SES student profile in non-metropolitan areas.

Table 2.1: Concentrations of high need students, by ISCEA: all schools, 2010

SES quintile	Indigenous Students (%)	Remoteness			
		Metropolitan (%)	Inner (%)	Remote (%)	Very remote (%)
Low SES	42.65	8.2	25.9	45.3	58.9
Lower middle	10.04	19.8	27.3	6.6	22.8
Middle	5.22	23.1	22.8	30.4	1.2
Upper middle	3.24	20.7	20.4	13.7	16.7
High SES	1.69	28.1	3.7	4.0	0.5

The multiple layers of social, racial and locational disadvantage compound the difficulties some schools face. The effects of multiple categories of disadvantage cannot be under-estimated in comparing levels of school performance.

Intake and context present key challenges for funding

If all schools across all locations had the same numbers of students and the same levels of student need then funding would be a fairly straight forward exercise of distributing funds evenly based on numbers of enrolments. However, as shown in the previous section, schools vary and they vary a lot depending on a range of factors including levels of poverty and income in different communities, socioeconomic characteristics of families, numbers of indigenous students, numbers of students with disabilities, numbers of refugees, remoteness of location, access to locally raised funds, and school size.

A critical question is how much supplementary or additional funding schools require to address needs associated with student intake characteristics and school context. In the United States there is much discussion and debate around the concept of 'adequacy' when it comes to funding schools. Adequacy is based on the principle that governments should provide enough funding for all students to be able to meet academic expectations. It is difficult, however, to determine exactly how much money is needed to give all students an 'adequate' education. Some schools will need to spend more than others, sometimes much more than others, to achieve any given performance level for students. The cost of achieving specified educational outcomes is dependent on the amount of effort that is required from a school to compensate for intake and ongoing environmental factors. This effort can vary depending on the mix of students and the levels of community support.

Equity funding is currently provided to Western Australian public schools to assist in meeting the additional costs associated with student characteristics and challenging community settings. Staffing and school budget allocations are supplemented through weighted formula funding or through a number of targeted initiatives for schools with higher concentrations of students from low SES, low incomes families, indigenous students, refugees, ESL students and for students with disabilities. Some of the adjustment is weighted through the SEI scale, supplemented by specific lines of funding to address particular groups of high need students such as those with disabilities.

Under current arrangements, schools that serve poorer communities receive additional support through their staffing entitlement, school grant and targeted program funding. One important question is whether a scale such as SEI is a good device for capturing the nature of SES disadvantage and for allocating funds and staffing. It is also important to ask how much difference SEI-linked funding makes to school performance and student outcomes. Are the current funding mechanisms working well enough to target and

address need and provide schools with the scope and capacity to close learning and achievement gaps?

Continuing gaps in achievement and other student outcomes raise the question of whether or not the current indicators of need are making a big enough difference. Of course, without funding allocated to the different areas of need the gaps may be far bigger. But continuing gaps on learning and achievement measures such as NAPLAN, academic progress, as well as gaps on behavioural dimensions such as attendance, suggest that existing arrangements are not sufficient to bridge the gaps.

To close the gaps requires major support for schools with high numbers of students from disadvantaged families. Unless the performance of these schools improves gaps at a system level will persist. Some schools do very well in meeting the needs and promoting good outcomes for disadvantaged students. But the close association between student characteristics and school performance is a distinct and persistent feature, and it calls for specific policy interventions. Extra activities, individual attention, special programs, and specialist support all require a level of resources which enable teachers to be released from their classrooms. So, too, does the up-skilling of experienced and long-serving teachers as well as the mentoring of early-career teachers. It is the funding model which seeks to release teachers from their classrooms or to multiply the number of classes through strategic reductions in class numbers.

Funding is only part of the issue in addressing need

Persistent social differences in student outcomes and school performance are a marked feature of school systems around the world. Most OECD nations attempt to address the problem of inequality through programs and targeted initiatives, both of which involve supplementary funding. The continuing patterns in other jurisdictions as well as in Western Australia suggest that there's a number of other questions beyond identification of need which should be raised in an investigation of how well funding arrangements work, given the different contexts of schools.

One of those questions, in the circumstance of continuing gaps in student outcomes, is about the programs and initiatives that are most successful in addressing student need and overcoming disadvantage. What works best to improve outcomes for disadvantaged students? The funding allocations are designed to provide additional resources, but how schools use them and whether the strategies are successful is not known. How do schools use their additional staffing resources? The allocation of staff across different year-

levels, the mix of staff at any given year-level, the use of teams of teachers to tackle particular issues, and the release of staff from classroom teaching are all important qualitative issues which go beyond the staffing formula allocation and supplementary funding initiatives.

Providing additional funds to schools without consideration of effective strategies or of what works may not represent the best approach to operating the funding model, as if it could compensate for all forms of disadvantage without any consideration of the quality of strategies and programs schools set up to assist students. A considerable research base is growing internationally on effective school programs and interventions for raising the levels of student engagement and achievement for students in at-risk categories. More importantly, there is also the experience of many schools in Western Australia which have been successful in serving the needs of disadvantaged students and promoting good outcomes. This experience needs to be tapped into and shared.

It may be better in the future if equity funding is more clearly and directly linked to provision of programs demonstrating positive learning or student outcome effects, through schools providing details on what they are doing to address additional needs. This method of accountability will be important in gaining insight into successful strategies such as expenditure on specific programs of welfare, innovative teaching and learning programs for particular groups and successful attendance policies. A program basis to equity funding may provide greater leverage as well as greater certainty in relation to targeting.

Current funding model creates anomalies and is not transparent

Currently, funding allocations are distributed through three main mechanisms: (1) school staffing entitlement (teaching and school support), (2) school grant, and (3) special purpose payments. Under the school staffing entitlement for each school a staffing establishment is calculated annually based on full-time equivalent enrolments which are adjusted for special needs (such as disability, ESL), programs (such as VET in Schools), year-level (stage weights or year-level multipliers) and circumstances of the school (such as SEI, location). The school grant is a consolidated cash grant which is calculated by taking account of the numbers of students, year-level, school classification, geographic location, and student needs.

Within the current funding model, the formulas for staffing and school grant allocations are designed to address variable cost factors, such as:

- small schools
- distance to population centres
- enrolments and year to year enrolment fluctuations
- student need linked to SES, indigenous backgrounds, disabilities, refugees, ESL
- administration costs linked to size
- increased costs for schools in remote locations
- program provision such as VET in Schools.

Some principals participating in the survey for the review of school funding described the current system as not treating all schools equally well and as hard to understand or follow. They pointed to the fact that in staffing terms schools with the same number and mix of students can receive the same full-time equivalent staffing allocation, but in salary terms the budgets can differ enormously. There is evidence to support this view. Following are the allocations to two metropolitan-based primary schools in 2009:

Primary School A	
Enrolments	665
SEI	109
FTE teaching staff	38.9
Teaching staff salaries	$3,269,621
Mean teacher salary	$84,052

Primary School B	
Enrolments	658
SEI	97
FTE teaching staff	38.9
Teaching staff salaries	$2,509,539
Mean teacher salary	$64,513

Both schools have the same FTE teaching allocation based on their enrolments, and receive the same numbers of teachers. The salary differences between the schools, however, are large. School A has a teacher salary cost of $3.2 million compared to $2.5 million in School B. The difference between the schools may have a real impact on students if the salary cost difference is linked to the experience and quality of teachers. Irrespective of impact, it is clear that at present there are imbalances in the resourcing of the schools. While there is formal equity in the number of teachers allocated to the schools, there is considerable inequality in resourcing when viewed in terms of salary cost. All schools are charged with the task of meeting the same high standards for improving student achievement, but this may be more difficult for some schools if they are allocated the same number of staff, but the staff they are allocated are very different in terms of experience and cost to those allocated to other schools.

Funding models should aim to deliver schools resources in fair and equitable ways to ensure that every student gets the same opportunity for a high quality education. This means that every school deserves funding that allows it to deliver high quality programs

and instruction based on the needs of the students at each school. To do this formula allocations need to include the following features:

- predictability
- stability
- responsiveness
- transparency
- fairness
- adequacy.

In any funding model, the mechanism of allocation and the outcomes need to be predictable. Schools should be able to estimate their budgets for future years with a reasonable degree of confidence to help them with longer term budget and school development planning. At the same the factors used in the formula should seek to ensure that budgets are stable and do not use factors that vary significantly for an individual school from one year to the next. Formula arrangements also need to be responsive in that they reflect differences and changes in the circumstances of individual schools and their student populations. They also need to be transparent, which means that they should be fairly simple or straight forward to follow: this means that instead of concealing the tough choices inherent in budgeting, funding arrangements should bring those choices out into the open. Also, importantly, the arrangements need to be seen by schools as a fair and equitable means of allocating resources between them. Ultimately, the funding model needs to give schools sufficient resources to allow them the opportunity to make the best choices for their students to achieve expected standards of learning.

Evident anomalies and inconsistencies, and feedback from schools, suggest that not all of these important features characterise the current resource allocation model.

Schools need greater flexibility

The capacity of schools to operate flexibly and to respond effectively through their staffing strategies in delivering high quality service to all students depends in part on whether they have sufficient resources in the first place but also in part on whether they have the flexibility in the deployment of their resources to respond to local student needs.

A key goal of any funding model should be to provide schools with flexibility in planning and resources. The aim of increased management at a local level is to give schools

greater authority, responsibility and accountability over finances and the allocation of resources. Increasing decision-making capabilities at the local level aims to allow administrators to better address the needs of individual students and respond to local context and circumstances. Under current arrangements, school funding includes monies for maintaining school buildings and grounds, for some aspects of human resources including recruitment and payment of non-teaching staff, and for the implementation of teaching programs, special programs and extra-curricular activities. Salaries are the largest component of the education budget, and currently, staff recruitment and allocation is centralized (except for IPS), so that in practice schools have only partial flexibility in controlling these resources.

In assessing the impact of funding, whether through staff establishment or special programs, the key issue from a school perspective is flexibility. To increase flexibility will mean giving schools increased responsibility for the management of their budgets which includes staffing costs. This would mean that teacher salaries need to be factored into the planning and operation of individual school budgets, with staffing no longer treated as an FTE allocation based on a staffing formula.

3. Funding across stages of learning

Resource allocation mechanisms need to take into account the relative cost of delivering effective and efficient schooling at different stages of primary and secondary education. Some systems tend to distribute resources weighted towards the entry and end points of schooling, partly driven by what has happened in the past. However, if differential funding is to apply to stages of schooling, this should be based on an educational rationale with research-informed thinking about where the emphasis should be placed. The way that good schools spend their budgets remains an important consideration, nevertheless, since up to a point this reflects the decisions of skilled practitioners, not simply policy or organizational constraints.

One approach to developing an educational rationale for differential funding is to identify those phases of schooling when a particular concentration of effort is required. This could be because student diversity is at a high level or because student development is associated with increased behavioural and attitudinal tensions or because the cognitive and cultural demands of the curriculum are at a stage where there is a strong risk of failure or of discontinuation, particularly amongst some groups. The history of attempts to boost achievement, for example, points very clearly to the salience of the earliest years of schooling. But internationally there has been an increasing focus on the middle years of schooling, especially the early (and sometimes turbulent) years of secondary school. The later years are frequently seen as important in terms of curriculum breadth and transition pathways.

There is no clear evidence or argument provided by the school funding research literature on what the critical phases are in primary and secondary schooling, and what funding weights should be attached to them. We can take some guidance, however, from three main sources: (1) evidence on the impact of practices and interventions at key stages of learning, (2) what other systems do and the results they achieve, and (3) the expenditure patterns in effective schools in Western Australia.

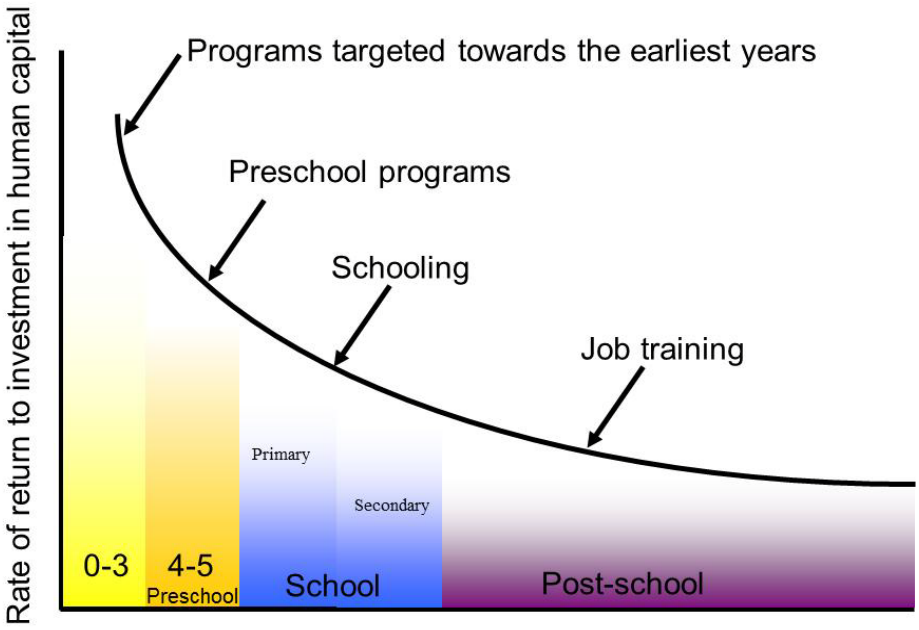
Key stages of learning

The early and middle years

One line of research points to the importance of the early years of schooling as critical in delivering improved outcomes from school. The clearest argument for extra emphasis in

the early years is provided by the work of Heckman (see Heckman and LaFontaine, 2007; Heckman, Stixrud and Urzua, 2006). The basic argument of Heckman and others is that there are sizeable gaps in cognitive and non-cognitive skills that develop early in children's lives linked to social background and family context and the gaps tend to grow during the school years and beyond. The gaps manifest themselves at each of the key stages of progression, leading for those who have fallen behind to slower progress in school, weaker literacy and numeracy skills, poorer subject and course choices, disengagement and early school leaving. For those affected, the gaps lead to increased chances in adult life of unemployment, lower earnings, crime, adverse health conditions and dependence on welfare (Heckman, Stixrud and Urzua, 2006).

Figure 3.1 Returns to a unit dollar investment



Source: Heckman and LaFontaine (2007).

According to Heckman, early intervention is the best way to reduce the gaps. Indeed, failure to address them early leads to declining effectiveness of later attempts to intervene and much higher cost. Later interventions, such as smaller class sizes in high school, alternative programs such as VET in schools, mentoring and personal development schemes for secondary school students, publicly subsidised job training schemes, adult literacy programs, tuition subsidies or expenditure on adult re-engagement programs, are much more expensive, have poorer outcomes and have much lower economic returns than early intervention. The longer school and education and training systems wait to

intervene, the more costly it is to have impact and change outcomes. These points are highlighted in Figure 3.1 which displays the declining rates of returns to delayed intervention or emphasis.

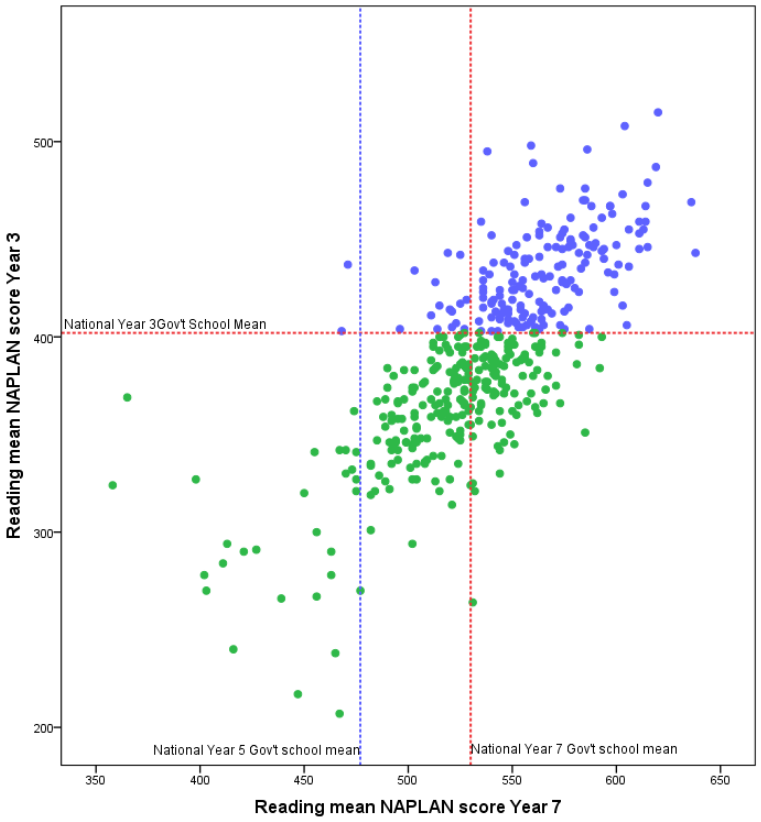
Linked to the issue of rising cost and declining benefit across stages of learning in addressing gaps in skills is the role of initial learning and skills to later acquisition. If students start to fall behind as they ascend school it impacts not only their confidence, but also their capacity to successfully negotiate later skills acquisition. Most subject areas, and some in particular such as mathematics, are organised sequentially across stages of learning in ways that require earlier mastery to ensure successful progress at later stages. If students fall behind then this tends to compound their difficulties by making subsequent learning more difficult and increasing the gaps in skill levels.

If a strong platform of achievement is not gained in primary school, problems are stored up for secondary school. One way to display this is to compare Year 3 and Year 7 achievement. Figure 3.2 presents mean reading achievement scores for public schools in Western Australia with enrolments of more than 100 students. The chart plots Year 7 scores (horizontal axis) against Year 3 scores (vertical axis). The schools are plotted according to their Year 3 performance relative to the national mean for public schools. The Year 5 and Year 7 national averages for public schools are marked on the horizontal axis.

The results show that there are large gaps across schools in reading skill levels. While there can be substantial variation within schools, the scores capture the average level of reading skills students have in each school. There are some primary and district high schools that contrast across the year-levels, from being well behind the national average in Year 3 to well above in Year 7. Others are ahead in Year 3 and remain ahead in Year 7, while some others are above national skill levels in Year 3, but behind in Year 7.

In Year 3 there are many schools that are below, some well below, national average skill levels. In Year 7, some of these schools are below the Year 5 average let alone the Year 7 average, meaning that students in these schools have a large gap to make up if they are to reach the average national skill level for Year 7. The large variations across schools in reading achievement levels at Year 7 highlight major gaps in skill levels across the government school population at the end of primary school. At this point of transition secondary schools have entering cohorts that will present major challenges in addressing gaps in achievement.

Figure 3.2 Year 3 NAPLAN Reading scores, by Year 7 scores: WA schools with more than 100 enrolments, 2011



The data suggest that there is a failure to reduce the achievement gaps during the early and middle years. Mean achievement levels are spread widely at Year 7.

The critical issue in looking at stage of schooling funding allocations is to identify the best points for providing resources to help schools address the gaps. The work of Heckman and others focusing on the economics of human skills would suggest that the concentration of effort needs to be early. Primary schools face their biggest challenge in the early years, particularly Pre primary. The relative gaps in skill levels are large at this time, and systems are aware of the effort that has to be made to bring students up to satisfactory general standards. There is a range of initiatives in place in Western Australia, as in other states, to address the gaps, initiatives including smaller class sizes and a range of literacy and numeracy schemes. These initiatives are designed to help primary schools succeed in reducing the gaps so that there is less pressure on resources during the intermediate and middle years (Years 3 to 7).

However, the final years of primary school involve preparation for a major transition in children's schooling to a new pedagogical environment which is organised more around the needs of the curriculum than the student, including less personal supervision and teaching that is more academically (or test-) focussed. The growing maturity of students and their capacity for personal organization and direction are increasingly important. Schools are aware of the need to maintain the focus started in the early years, and renew efforts to lower achievement gaps and build the strongest possible platform in both cognitive and affective terms for entry to high school. Evaluations of intensive support programs point to the need for sustaining the effort of the early years to ensure that there are continued gains. It would suggest, in conjunction with the NAPLAN results presented in Figure 3.2, that the middle years might also require support because at this stage under current arrangements there remain large gaps in student achievement and skill levels.

The later years

There are specific factors associated with secondary schooling which are often cited as having cost implications. For one thing, provision for students particularly in the later years tends to have higher costs associated with non-salary items, such as more costly science materials, and sporting equipment. Schools also often organise their curriculum around electives and specialised subjects that can break classes of students into smaller groups, particularly in the later years. There is also the matter of extra-curricular activities which can also require additional resources. Often larger, secondary schools can require more administrative personnel, as well as student well-being and welfare staff.

Needing to deal with student diversity in the final years schools also often provide alternative programs such as VET in Schools, and try to offer a breadth of subjects to attract and retain students. This means that classes in the senior years tend to be smaller. While it costs more to run these classes, it is also true that the benefits also tend to be spread more thinly. On average every fourth or fifth student does not finish school. Each student who does complete Year 12 enjoys access to a greater share of resources, partly because classes are smaller and partly because of the costs of the staff used to teach in the senior years.

The main rationale for the use of additional resources in the senior years is to broaden the pool of school completers by offering a wide range of options. However schools face a competing imperative and that is to ensure that students enter Year 12 well-prepared in whatever field of study, and that more students remain to Year 12. This latter focus

suggests that schools need to deploy their resources in the junior year-levels to help bridge skill gaps and provide the platform of skills and achievements that will sustain high retention. The costs of Year 12 fall when larger numbers of students remain and class sizes grow. This is a tension or dilemma secondary schools face: on the one hand the need to focus effort in the junior years to bridge skill gaps, raise achievement and thereby promote stronger retention, and on the other hand offering a breadth of options needed to attract and retain students.

Currently, secondary schools also need to deal with the generic costs of the relative spread of achievement. Secondary schools often recruit from a range of primary schools and have a major task in bringing students together, settling them down to work as classes, and overcoming wide gaps in skill levels. This requires at least comparable resources to that in upper primary school to manage the transition phase, and in the endeavour to build achievement levels, particularly for those who are weakest, to implement organizational approaches (such as mini-schools, intensive pastoral care, team approaches to student monitoring and case management) which have additional cost implications.

Views of WA principals

There were varying views expressed by principals who participated in the survey about where the emphasis should be, as the summary of responses in the following points show:

- Some are satisfied with the current arrangements comprising higher weights at the beginning and at the end ("both ends of the spectrum need more, the early and later years deserve higher funding, so the current formula is ok").
- Strong agreement that the early years are very important ("focus needs to be very much in the early years, ages 2-3, Kindy and Pre Primary", "have to strike early to address differences in how ready kids are for school").
- Effort of the early years needs to be maintained into the middle years ("formula is light on in the middle years, students in years 4/5 start to drift resulting in poor rapport with staff and engagement", "Our NAPLAN results are great at Year 3, drop off at Year 5, then get worse at Year 7", "engagement drops off so extra funding would be good to support learning").
- General consensus that Year 7 should be in secondary school, and funded under secondary model to help improve resources for this year-level.
- Repeated view among high school principals that secondary schooling is more complex, and thus requires resources ("education at our level is more complex as

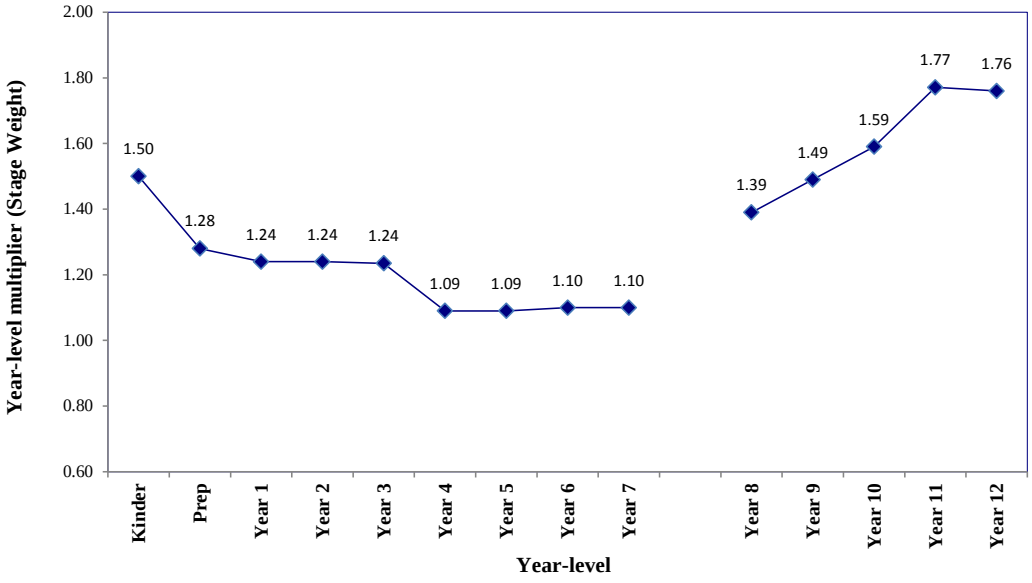
we have to deal with adolescents with difficult social and emotional needs, and these high stakes years are more expensive to teach", "senior years require more funding because require more diverse provision (pathways planning).

- Some support for extra emphasis in lower secondary years ("the staffing formula does not take into account the very intensive needs of transition from primary to secondary and the cohort of early adolescents with their very real social, emotional and physical needs").

What other systems do

Western Australia distributes resources weighted towards the starting and end points of schooling. The year-level loadings or stage weights are displayed in Figure 3.3. Looking across stages of schooling, there is a U-shaped pattern involving higher per-student weighting in the early years of primary school and higher per-student weighting in the upper years of secondary school. The weighting for kindergarten is 1.5 on a full-time enrolment basis.

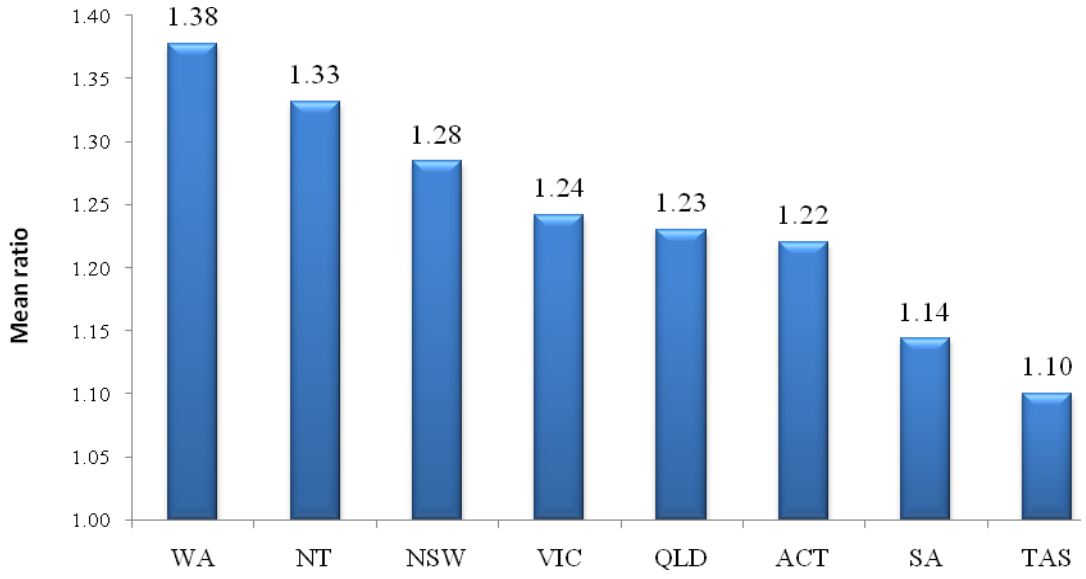
Figure 3.3 Year-level allocation weights per full-time equivalent enrolments



All other states and territories of Australia also allocate more funds for secondary than for primary schools, providing somewhere in the order of between about 20-30 percent more resources for secondary schools as compared to primary schools. One comparison is

demonstrated by student-staff ratios for public schools. Figure 3.4 presents the mean school student to teaching staff ratios of secondary to primary teachers across schools in all jurisdictions. The data are for primary and secondary schools only (this excludes combined schools) and are based on the mean secondary to primary full-time equivalent student-staff ratios across schools. It is important to note that the rates for Tasmania and the ACT are based on the junior secondary years and exclude their senior colleges. If the senior colleges were included their ratios would be higher.

Figure 3.4 Student-staff ratios of secondary to primary teachers: public schools, Australian states and territories, 2011



Source: derived from data supplied by the WA Department of Education.

The ratios show that Western Australia has the highest gaps in teacher allocations between secondary and primary schools. For every teacher allocated to a primary school for a set number of students, secondary schools are allocated 1.38 teachers for the same number of students. The ratio averages out year-level differences within primary and secondary schools. While the Year 11 staffing multiplier is 1.77, and the Year 4 multiplier only 1.09, when the multipliers across all year-levels are averaged out it means that secondary schools gain a 38 per cent advantage in teaching staff allocations for the same numbers of students.

The gaps in teacher resource allocation are lower in all other states and territories. The largest states New South Wales, Victoria and Queensland deliver teaching staff resource

differences in favour of secondary schools at a rate of between 23 and 28 per cent (on a per capita basis). The rate for South Australia is only 14 per cent.

The rates in the eastern states and territories are more consistent with historical patterns in other countries. According to the US Consortium for Policy Research in Education historically "the common practice across the world is to provide more funds for secondary than for primary schools, and the typical pattern … is to provide about 25-30 percent more for high schools as compared to elementary schools" (Odden, 1999). Despite this claim, there is a lot of variation across countries and across states within nations. The United States provides a clear example. A 2005 study of weights for different grade levels in the US reported the following stage weights for a group of selected states:

Same weight			Secondary school emphasis			Primary school emphasis		
State	Primary Weight	Secondary Weight	State	Primary Weight	Secondary Weight	State	Primary Weight	Secondary Weight
Colorado	1.00	1.00	Arizona	1.16	1.27	Alabama	1.26	1.22
Delaware	1.00	1.00	District of Columbia	1.04	1.20	Delaware	1.06	1.00
Kansas	1.00	1.00	Florida	1.00	1.11	Georgia	1.18	1.00
Kentucky	1.00	1.00	Minnesota	1.09	1.30	North Carolina	1.25	1.10
Montana	1.00	1.00	New Jersey	1.00	1.20			
Nevada	1.00	1.00	New Mexico	1.16	1.25			
Ohio	1.00	1.00	Oklahoma	1.12	1.20			
Oregon	1.00	1.00	South Carolina	1.12	1.17			
Utah	1.00	1.00	Vermont	1.00	1.25			
			New Hampshire	1.00	1.20			
			Pennsylvania	1.00	1.36			
			Wyoming	1.00	1.03			
			Massachusetts	1.00	1.09			

Source: Griffith (2005)

The list presents the weights across broad stages of schooling. Different weights within stages have been averaged to present average differences between primary and secondary schools.

Stages of learning are not taken into account in some States. Nine states listed in the first column have the same weight applied to both primary and secondary school. In these states, students are treated equally when it comes to the allocation of resources. The largest group of states, listed in the middle columns, provide more resources to secondary

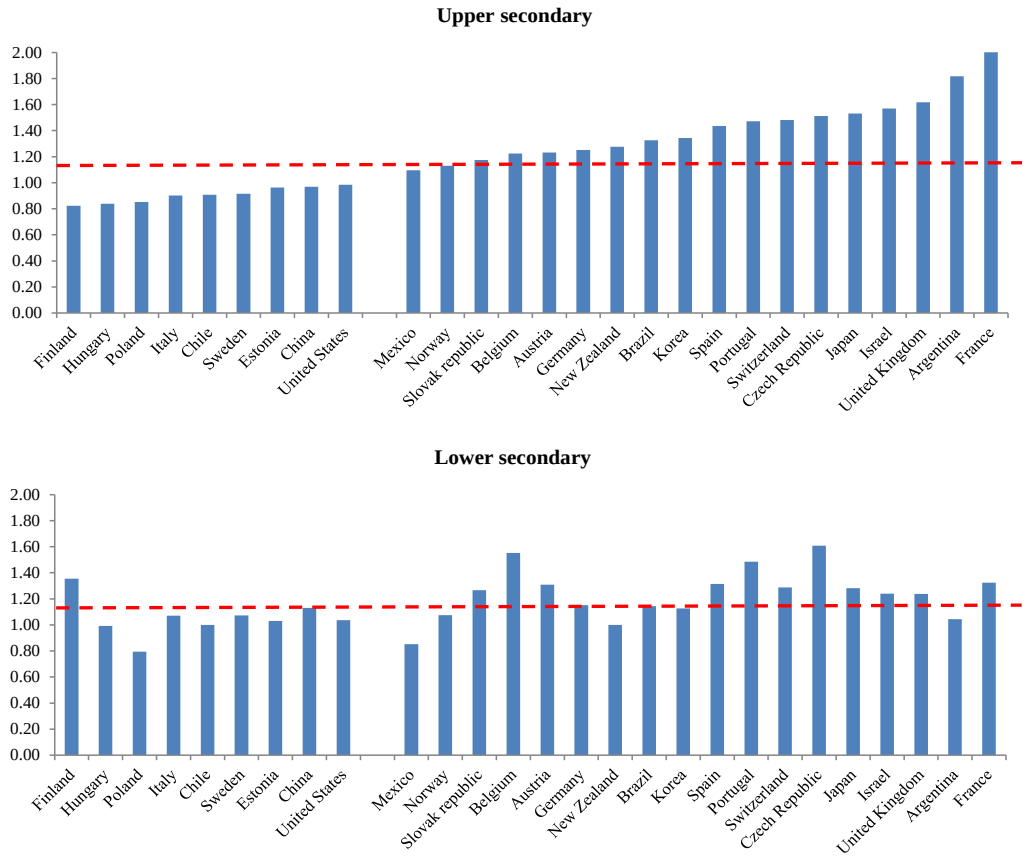
schools, though the level of concentration varies considerably. The largest difference is in the state of Pennsylvania where secondary schools receive a 36 per cent loading relative to elementary or primary schools. By contrast, the smallest difference is in Wyoming where secondary schools receive a 3 per cent advantage over primary schools. The average across all of the states in the middle columns, where there is a greater resource focus on secondary schools is 14 per cent (1.14 to 1.0).

Not all states deliver resources to secondary schools at the same or at a higher level than primary schools. The formulas in the four states in the final columns take very different approaches to the other states. Alabama, Delaware, Georgia and North Carolina provide differential or weighted funding in favour of primary schools. This represents quite a different resource allocation decision, away from the traditional emphasis toward higher funded secondary students and toward greater funding for primary schools. The rationale for this shift in resource allocation, according to Odden (1999), is to develop the basic skills "early in the career of a child, under the assumption that if students can read, write and do mathematics proficiently by Grade 3, then teachers at higher grades have virtually an unlimited horizon for student achievement. Of course, this also reflects the obverse of this proposition that late intervention for secondary students who have not developed good literacy and numeracy skills is not only inefficient, but also very difficult to make effective".

The different patterns evident in the United States recur in other parts of the world. Figure 3.5 presents teacher student ratios for the upper secondary and lower secondary year relative to primary school in a range of OECD countries. The ratios of students to teaching staff provide one indication of how resources for education are allocated. These ratios can be used to construct ratios of secondary to primary school resources similar to the ratios presented in Figure 3.4. The OECD average ratio for each level of schooling is marked with a red line.

The figure shows that resource differences favour upper secondary level in 18 of the 27 countries with available data, and in 20 of the 27 countries at lower secondary level. This means that in most countries the student-teacher ratios tend to fall as students move from primary to secondary level, in some countries by a substantial margin. For example, in France there are about two upper secondary school teachers to every primary school teacher for the same number of students. France stands at the extreme. The ratio is also high in Argentina, the United Kingdom, Israel and Japan (above 1.4). These nations have concentrated a lot of resource effort in the senior years of schooling.

Figure 3.5 Ratio of secondary to primary teachers in schools based on student-teacher ratios, by level of education (2009)



By contrast, at upper secondary level, in 9 countries the ratios favour primary schools, i.e. primary schools are provided with a higher teaching staff resource allocation for a given number of students than are the schools delivering upper secondary education. Finland stands out with upper secondary schools receiving only 80 per cent of the allocation provided to primary schools based on the same number of students. Sweden, the United States, Poland and Italy are also in this group of nations which concentrate their resource effort in the primary school years relative to upper secondary.

While Finland favours the primary years over upper secondary, this is not true for the lower secondary years. Finland has an emphasis in its resources on the lower secondary years (Year 7 to Year 10) with this stage attracting a ratio of teachers over primary school of 1.35 to 1.00. This rate is well above the OECD average of 1.18.

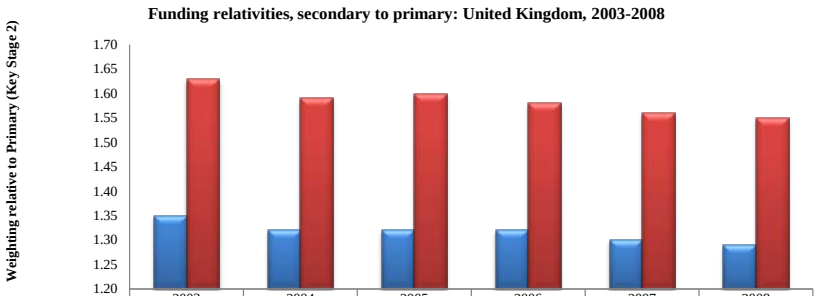
Shifting emphasis to the early years

Odden (1999) has noted that as school systems have moved to formula-based school funding there has been a shift towards reducing differences in funding relativities between primary and secondary schools, and a move to providing more resources in the early years. For example, in a description of the review of the school funding system of Wyoming, Guthrie and Rothstein (1999, p. 233) reported the reviewers' concern over the imbalance between primary and secondary school funding, noting the need for change so that:

> "within reasonable boundaries, this imbalance could and should be redressed, and that additional elementary level school resources, appropriately distributed, would be a better investment. By spending more, appropriately, early on, consultants believed that (1) a better learning foundation could be constructed from which students could then benefit in the remainder of their schooling and (2) more intense resources, in the particular form of smaller regular classes for elementary students, would enable their teachers more productively to identify and cope successfully with exceptional students".

There is evidence of this move internationally as nations attempt to improve student outcomes by targeting gaps in skills at earlier ages. One indicator of this is a shift in teacher allocation relativities in various countries. This is picked up in the recent OECD report, *Education at a Glance* which reported that from 2000 to 2009, the average class size in OECD countries decreased in primary school and increased very slightly in lower secondary school (OECD, 2011).

Funding reviews in the United Kingdom have also noted a continuing shift in resources towards primary schools, initially identified in the 1990s (Education Funding Stratgey Group, 2001). The trends in national funding relativities between primary and secondary have continued according to recent data:



	2003	2004	2005	2006	2007	2008
Lower Secondary	1.35	1.32	1.32	1.32	1.30	1.29
Post-15	1.63	1.59	1.60	1.58	1.56	1.55

Source: Lancashire School Funding Formula Review, 2010

A recent review in one Local Education Authority observed that there had been growing concern from primary schools questioning the assumption that primary education should be less well funded than secondary (Lancashire School Funding Formula Review, 2011). Similar arguments are echoed in Australia and elsewhere. There has been debate about the merits of the balance of funding over time and dissatisfaction frequently expressed by principals of primary schools. They point to the need at the earlier stages of schooling for teachers to have greater non-classroom time than currently provided, to help plan and co-ordinate classroom and school strategies to better address student needs if improvements in achievement levels are to be made and primary schools are to deliver to secondary schools cohorts of students with a stronger and more even platform of cognitive skills. At the same time, secondary schools point to the need for additional funding to provide for vocational options, different curriculum organisation and staffing arrangements,and the greater levels of specialisation and hence cost when subject options are introduced in the later years.

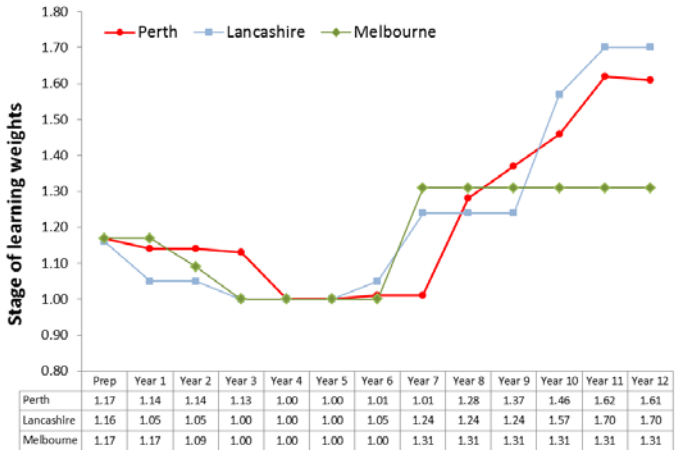
Comparing Western Australia and other systems

The comparisons in the previous section present international differences in the funding of the broad stages of schooling (primary, secondary). It is also possible to make comparisons of resource allocations across year-levels within these broad stages. Figure 3.6 presents four different systems for comparison with Western Australia. The top panel of Figure 3.6 compares funding with the Local Education Authority of Lancashire in the United Kingdom and the state of Victoria. In these systems a greater amount is spent by public schools on secondary than on primary school students, though there is a U-shaped funding profile across year-levels showing that each of the systems invests more in the early years and the later years, though the investment is much more heavily in the later years. Lancashire has the highest loadings at this level with students in Year 10 receiving $1.57 for every dollar spent in Years 3, 4 and 5. The loading in Years 11 and 12 is $1.70. Western Australia has a similar year-level allocation profile. Victoria has a similar early years weighting, though the allocations in secondary school are even across year-levels and set at $1.31 for every dollar allocated in Years 3 to 6.

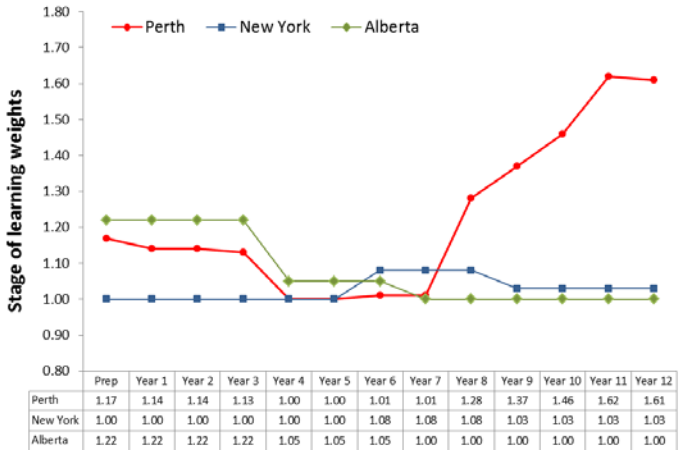
The lower panel in Figure 3.6 compares Western Australia with New York and Alberta. What is striking about the Canadian and North American systems is that they do not focus funding in secondary schools in the same way as Western Australia. New York introduced a new funding model, *Fair Student Funding*, in 2007-2008 with 3 main aims: (1) increase equity while preserving stability, (2) improve student achievement, and (3) make school budgets more transparent (New York City Department of Education, 2007). The system moved from a model which focused effort in high schools to a system that emphasized the middle years, on the grounds that it is in the middle years that students

experience the largest falls in achievement. High schools receive a 1.03 loading relative to elementary schools while middle schools receive a loading of 1.08.

Figure 3.6 Comparisons of year-level differences in funding allocations: 5 systems



	Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Perth	1.17	1.14	1.14	1.13	1.00	1.00	1.01	1.01	1.28	1.37	1.46	1.62	1.61
Lancashire	1.16	1.05	1.05	1.00	1.00	1.00	1.05	1.24	1.24	1.24	1.57	1.70	1.70
Melbourne	1.17	1.17	1.09	1.00	1.00	1.00	1.00	1.31	1.31	1.31	1.31	1.31	1.31



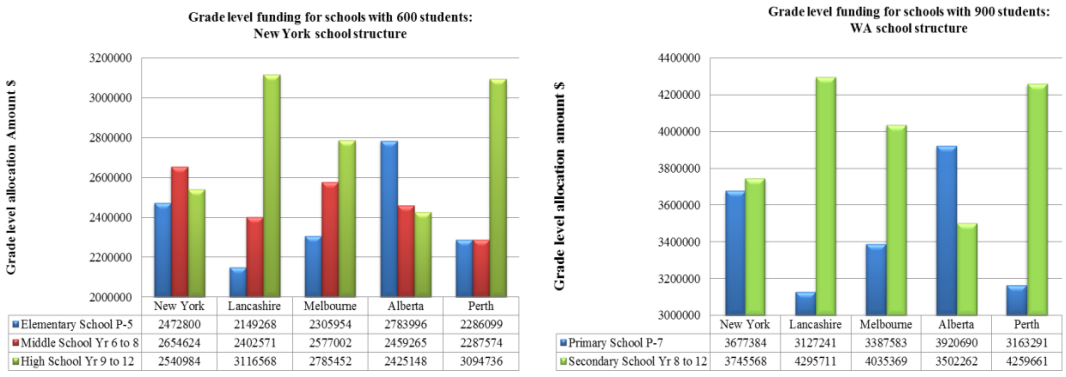
	Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Perth	1.17	1.14	1.14	1.13	1.00	1.00	1.01	1.01	1.28	1.37	1.46	1.62	1.61
New York	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.08	1.08	1.03	1.03	1.03	1.03
Alberta	1.22	1.22	1.22	1.22	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00

Alberta reverses the patterns of all the other systems. It concentrates its effort in the early years. Pre-Primary to Year 3 receive a loading of 1.22 relative to high schools which receive 1.00. The upper primary years (Years 4 to 6) receive a loading of 1.05 relative to the high school years. It is worthwhile noting that Alberta's students continue to rank among the best in Canada and the world, according to the results of the 2009 Program for International Student Assessment (PISA). Alberta students placed second in the world in reading and scientific literacy, and eighth in mathematical literacy (Statistic Canada, 2010). Alberta, the highest-scoring province in Canada, achieved results comparable to those of Finland, which was the highest scoring OECD country. The strong results for

Alberta on PISA remain after controlling for differences in the social composition of populations.

A critical question to ask, given the differences in funding weights, is what the differences would mean for individual schools in each system. What would an elementary school in New York receive in base funding if it was located in Lancashire or in Perth or Alberta, if the same amount of New York funds were available in each system? Alternatively, what would a secondary school in Perth receive if it was located in New York or in Melbourne? Figure 3.7 presents the results of such a comparison. The first panel gives the budgets New York schools would receive if they were located in the other systems and subject to their year-level funding weights. The comparison is for an elementary school (Years P to 5), a middle school (Years 6 to 8) and a high school (Years 9 to 12), each with 600 students and assuming the same New York base funding budget totals for 2007 were used.

Figure 3.7 Comparative estimates of funding amounts applying the year-level relativities of each system according to the base level per capita funding amounts of New York in 2007 ($)



	New York	Lancashire	Melbourne	Alberta	Perth
Elementary School P-5	2472800	2149268	2305954	2783996	2286099
Middle School Yr 6 to 8	2654624	2402571	2577002	2459265	2287574
High School Yr 9 to 12	2540984	3116568	2785452	2425148	3094736

	New York	Lancashire	Melbourne	Alberta	Perth
Primary School P-7	3677384	3127241	3387583	3920690	3163291
Secondary School Yr 8 to 12	3745568	4295711	4035369	3502262	4259661

The second panel gives the budgets Perth schools would receive if they were located in the other systems and subject to the other systems' year-level funding weights. The comparison is for a primary school (Pre-primary to Year 7) and a secondary school (Year 8 to Year 12), each with 900 students and assuming that the same New York base funding budget totals for 2007 were used. The issue here is not the actual total budget (equity loadings and other supplementations are excluded), but the differences across stages associated with the differences in year-level funding relativities.

The results show that if a New York elementary school was located in Lancashire it would have received about $320,000 less than it actually received from base per capita

funding. If the school was located in Perth, it would have received about $187,000 less while if it was located in Alberta it would have gained $311,000 more using New York budgets as the guide. A New York high school, on the other hand, would have received vastly greater amounts in Lancashire ($576,000) and in Perth ($554,000) thanks to the high year-level loadings for this stage of schooling in both systems. The New York high school would have lost $115,000 if it was located in Alberta, but gained $244,000 in Melbourne, due to differences in stage weights across the two systems.

The gaps between high school and elementary schools are greatest in Perth and Lancashire. The relative gains or losses for each type of school located in the different systems, using each level of school in New York as a comparative weight of 1.00, are as follows:

	Elementary	Middle	High
New York	1.00	1.00	1.00
Lancashire	0.87	0.91	1.23
Melbourne	0.93	0.97	1.10
Alberta	1.13	0.93	0.95
Perth	0.92	0.86	1.22

The different systems concentrate their resources in different ways. It is difficult to establish the differential impact of the various approaches in terms of student outcomes. It is possible to examine what it means for schools, though, if they were restricted to the same budget across systems. The second panel of Figure 3.7 looks at what Perth schools would receive if they were located in other parts of the world and subject to New York's base per capita funding.

A secondary school in Perth with 900 students would receive $1,096,371 more than a primary school in Perth with 900 students, if the total budget was set to the baseline New York per capita levels. The gap between secondary and primary in Lancashire would be slightly greater $1,168,470 reflecting the much higher funding relativities for the later secondary years in both Lancashire and Perth. By contrast the gap would be a more modest $647,786 between a primary and secondary school in Melbourne with 900 students each, a negligible $68,184 gap if the schools were located in New York, and a gap of $418,428 in Alberta, but in favour of the primary school rather than the secondary school.

The relative gains or losses for each type of school located in the different systems, using each type of school in Perth as a comparative weight are as follows:

	Primary relative to Primary	Secondary relative to Secondary	Secondary relative to Primary
New York	1.16	0.88	1.18
Lancashire	0.99	1.01	1.36
Melbourne	1.07	0.95	1.28
Alberta	1.24	0.82	1.11
Perth	1.00	1.00	1.35

The operational budgets for schools in stage-based funding relativity terms differ markedly across the systems. These differences highlight different philosophies at play about what is important and where different systems feel that the effort needs to be placed to achieve the best student outcomes though in some systems part or much of this difference may be products of history.

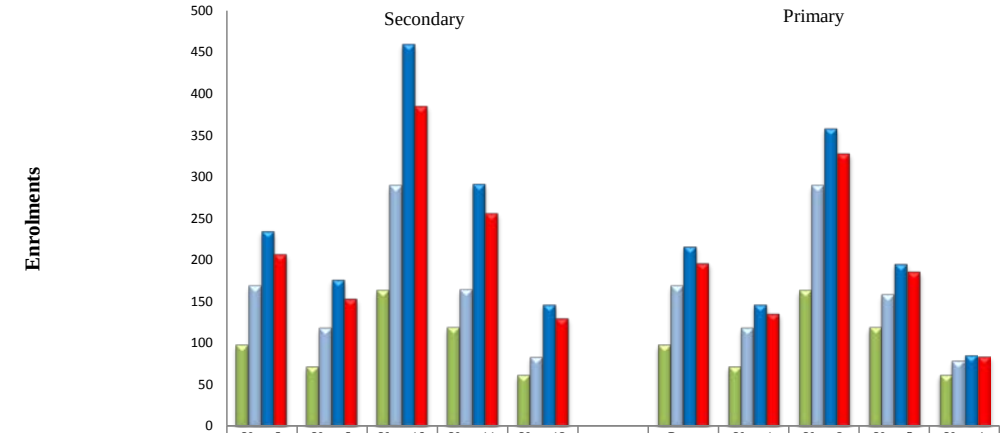
Analysis of expenditure in Western Australian schools

As well as thinking about funding relativities for stages of schooling from a comparative and pedagogical perspective, there is also value in looking at how schools currently use their resources and the implications this might have for funding across year-levels. The use of resources will be constrained by the historical effects of existing stage weights, but within the broad stages of schooling, there is still opportunity for schools to make use of their resources in different ways. If there are unique patterns that mark schools that are 'value-adding' in terms of student outcomes, then these may provide a guide for identifying effective funding relativities across year-levels. This section will examine this issue, beginning with the impact of the year-level multipliers that are used in the funding of Western Australia schools.

The multiplier effect in Western Australian schools

Currently, staffing resources are allocated to public schools using formulas that apply a series of weights, some linked to student characteristics (such as educational need levels based on student disabilities, ESL) and some linked to school characteristics (such as SEI and school size). Year-level multipliers (stage weights) are applied on top of the weighted enrolments which have been adjusted for student and school characteristics. In effect, weights are multiplied against weights which can vastly increase the allocations. It is worth looking at the impact of this on the resources made available to schools.

Figure 3.8 Comparison of different weighted adjustments for equity and year-level



	Year 8	Year 9	Year 10	Year 11	Year 12		Prep	Year 1	Year 2	Year 3	Year 4
Actual enrolments	98	72	163	119	62		98	72	163	119	62
Enrolments after equity weighting	169	119	289	165	84		169	119	289	159	79
All Year-level weighted	235	177	460	292	147		217	147	359	196	86
Only actual Year-level weighted	208	154	385	257	131		197	136	328	186	85

Figure 3.8 presents the weightings applied to a high school in 2010. The school had an actual total enrolment of 514. Many students with disabilities received educational support and others received ESL support. Most Year 11 and 12 students were undertaking VET in Schools (VETiS) subjects and received the relevant supplementary VETiS weighting (1.1). The first bar presents the number of actual enrolments for each year-level and the second bar presents the weighted enrolments after adjusting for the program and equity loadings. The third bar for each year level presents the weighted enrolments that the school gained in 2010 which was based on multiplying the equity weighted enrolments by the year-level weights. This is the imputed enrolment recorded for the school on which funding was based. The final bar for each year-level presents an estimate of enrolments in which the weights have been treated separately, with actual enrolments multiplied by the year-level weights and this figure added to the difference in enrolment between actual enrolments and the equity weighted enrolment.

For comparisons, the same calculations are applied to a primary school with the same student profile and number of enrolments, using the Pre-primary to Year 4 year-level weights.

The purpose of the comparison is to highlight the intensification of resources that occurs for secondary schools when equity and program loadings are multiplied by the year-level loadings. In effect, in Western Australia a student with the same disability is treated differently depending on the stage of schooling they are at, as a result of the differential year-level multipliers. There is an apparent assumption that the need of the student has become greater, or at least that the capacity of the school to address the need has changed. In relation to program funding, schools are provided with a 10 per cent loading for VETiS. However, the loading is also multiplied against the year-level weight. Relative to a Year 7 student, the VETiS supplementation is actually closer to 17 per cent after the application of the different year-level multipliers.

The approach of applying stage weights to supplementary funding does not occur in many other systems. In New York, for example, the year-level weights are applied to the base enrolments and then equity loadings are added. The equity loadings treat elementary and secondary school students the same when it comes to addressing additional need. The same is true in Victoria and in Alberta.

Figure 3.8 shows that while the actual enrolment in the particular secondary school in 2010 was 514, the equity adjusted enrolment (after applying program, ESL and education support weights) was 825. When the year-level weights were applied to the equity-adjusted enrolments the final enrolment on which funding was based was 1311. If the approaches used in New York, Alberta and Victoria were applied in Western Australia then the final enrolment for funding would have been 1134 (actual enrolment multiplied by year-level weight plus additional equity loadings applied to the base enrolment). The difference in funded enrolment levels, based on average teacher wages in Western Australia would be close to $1.06 million.

The other comparison of note is that with a primary school with the same student profile (panel two of Figure 3.8). In the primary school with 514 base FTE enrolments the equity adjusted enrolment would have been 815 (10 less than the secondary school because of VETiS). After the application of year-level weights this would produce a funding enrolment of 1004 which would deliver 23.4 per cent less staff resource than for the secondary school, though with students of equivalent funding need. If the same approach to funding was applied as in New York, Victoria and Alberta, the funding enrolment in the primary school would have been 932. Taken together and applying average teacher salaries it means that the secondary school gains about $642,000 more than the primary school for the same disadvantaged students due to the practice of multiplying equity and program loadings against year-level weights.

Effective schools and patterns of expenditure across year-levels

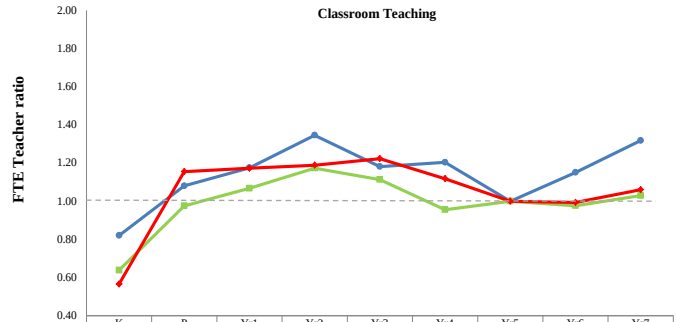
How schools currently use their resources is an important guide to the relative costs of delivering education. However, patterns across year-levels are not necessarily just a reflection of strategic judgements and sound educational choices on the part of schools. Where central funding is targeted to a prescribed year-level (as is the case with Kindergarten assistants), schools have less flexibility in the way they can use their resources. For example, programs in Years 11 and 12 where course provision as well as subject choices and specialised offerings are framed by the requirements of the WA Certificate of Education per capita costs may spike, particularly in smaller settings. These constraints mean that existing patterns of year-level expenditure must be treated with caution as a guide to ideal practice. Even so, there can be revealing differences in the ways schools use their resources across year levels and the results that are produced.

In considering year-level or stage relativities the estimated comparative costs of the stages of schooling need to be seen in the context of differences in the relative teaching effort required to achieve growth in average levels of learning over these stages and to minimise differences between students at each stage. Resource usage patterns indicate that schools do experience different pressures over the stages of schooling and also that their responses vary according to their situation.

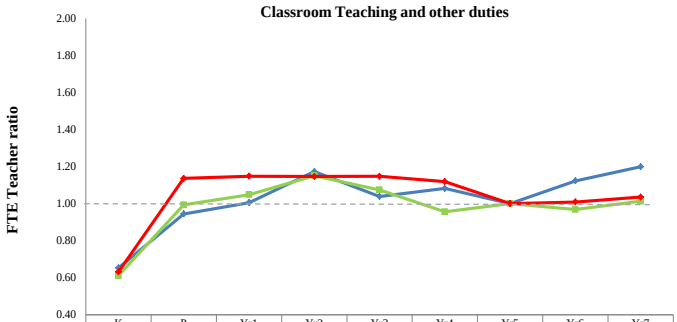
Figure 3.9 compares the full-time equivalent (FTE) staffing relativities for three groups of schools delivering primary school education (K-7) that participated in the 2011 school survey: (1) schools performing at expected levels across a range of indicators including NAPLAN and attendance after adjusting for student characteristics, location and academic intake (strong performing schools, shown with green markers), (2) schools performing above what might be expected given their students and context (high performing schools, shown with red markers), and (3) schools performing below what might be expected after controlling for students and context (low performing schools, shown with blue markers).

Four sets of results are presented based on the resources that are included in the analysis. The first panel includes only information on the use of classroom teachers across year levels (teacher allotments to classes). The second panel includes duties other than teaching (DOTT) in addition to classroom teaching. The third panel adds classroom support staff, such as education assistants, to classroom teaching and other duties. The final panel includes all salary resources apart from education support staff. It includes teachers, education assistants, administrative (CPSU) staff, cleaners and gardeners, principals, assistant/deputy principals and heads of learning areas.

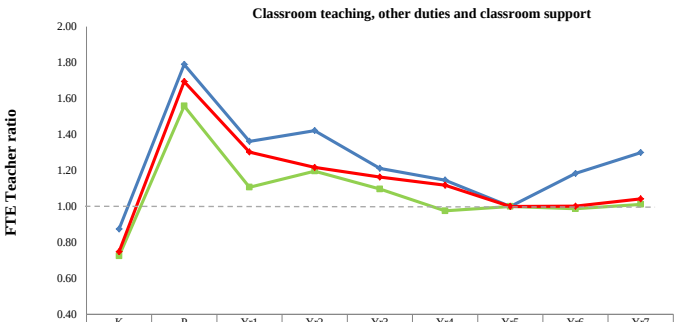
Figure 3.9 School performance and per capita FTE teacher ratios by year-level: primary and combined schools, Year 5 treated as the base



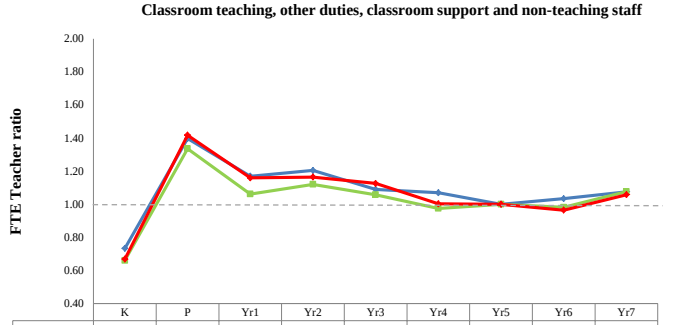
	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Below	0.82	1.08	1.18	1.35	1.18	1.20	1.00	1.15	1.32
Predicted	0.64	0.98	1.07	1.17	1.11	0.96	1.00	0.98	1.03
Above	0.57	1.15	1.17	1.19	1.22	1.12	1.00	0.99	1.06



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Below	0.65	0.94	1.00	1.17	1.04	1.08	1.00	1.12	1.20
Expected	0.61	0.99	1.05	1.15	1.07	0.96	1.00	0.97	1.01
Above	0.63	1.14	1.15	1.15	1.15	1.12	1.00	1.01	1.03



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Below	0.87	1.79	1.36	1.42	1.21	1.15	1.00	1.18	1.30
Predicted	0.72	1.56	1.11	1.20	1.10	0.98	1.00	0.99	1.01
Above	0.75	1.69	1.30	1.22	1.16	1.12	1.00	1.00	1.04



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Below	0.73	1.40	1.17	1.20	1.09	1.07	1.00	1.03	1.08
Predicted	0.66	1.34	1.06	1.12	1.06	0.98	1.00	0.98	1.08
Above	0.67	1.42	1.16	1.16	1.13	1.00	1.00	0.96	1.06

FTE teacher ratios are measured through per capita staffing derived by dividing the FTE staff employed at each year-level by enrolments at that year-level. The ratios are relative to Year 5 which is the year-level used as a base, meaning that the numbers in every other year-level are compared to resource-use at Year 5. For example, if the ratio for Year 2 is 1.44 it means that for every FTE staff member employed at Year 5, there are 1.44 FTE staff members employed in Year 2.

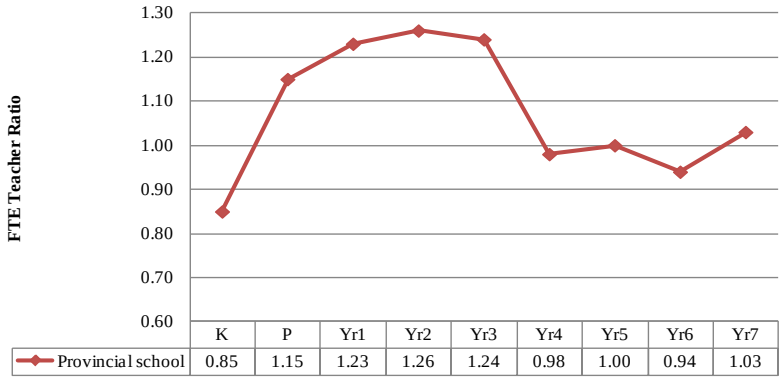
Primary and combined schools face a major challenge in the early years which is to recognise and respond to the wide variation in skills of children entering school, and also to address the uneven rates at which student learning progresses. The early years represent a platform which establishes a foundation of learning that has lasting effects. International research suggests that intensive early effort can have lasting effects (for example, see Heckman and Krueger, 2005). There is, in short, a strong educational rationale for higher relative expenditure during the early years. The focus through provision of small class sizes in K-3 recognizes this. It is also supported by the spending patterns of effective schools.

The results show that one difference is the emphasis low performing schools have in the later primary years. The use of teachers in the upper primary years in schools performing at below expected levels is higher than in other year levels for every teacher in Year 5, 1.32 are used in Year 7 and 1.15 in Year 6, compared to 1.08 in Prep. This emphasis on the later primary years contrasts with the high performing schools where the staff ratios are roughly equivalent from Year 5 to Year 7 and lower than the early years (1.15 in Pre Primary).

Effective primary schools use their resources strategically

Some schools use their staff very strategically and size can contribute to this. One such school in a provincial centre with around 450 enrolments, an SEI below 100 and an indigenous student cohort of 6 per cent, is performing on many indicators at a high level. It had an average attendance rate of 93 per cent over the last three years, above the state average, the percentages of students in Year 5 NAPLAN above the national minimum standard were higher than the national rates in reading (85 per cent against 81 per cent), writing (87 per cent as against 83 per cent) and numeracy (91 per cent against 82 per cent) and much higher than the state averages. The performance was even stronger in Year 7, with larger proportions above the minimum standard, suggesting that the school is value-adding as students ascend school. This school uses a range of practices to promote learning and engagement. It gives extra literacy and numeracy support in the middle years with special attention for small groups of students with needs, a science

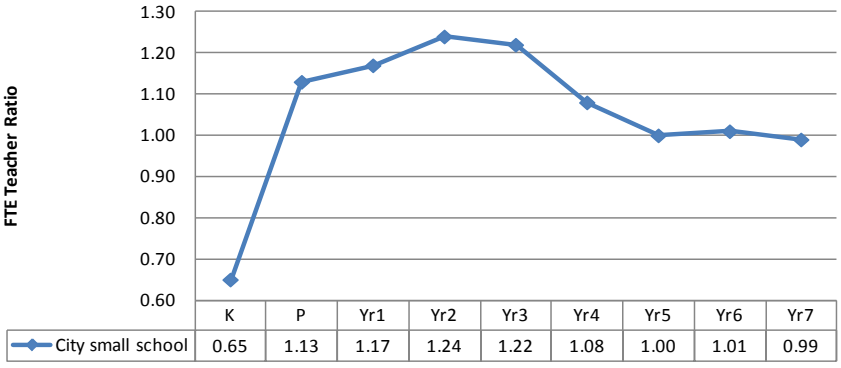
enrichment program and a specialist speech program with targeted development in the early years. The school deploys teachers according to the following ratios with Year 5 taken as the base:



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Provincial school	0.85	1.15	1.23	1.26	1.24	0.98	1.00	0.94	1.03

Size assists this school as the year-level cohorts are around 60 students, including at Year 7. The school uses a similar ratio of staff from Year 4 to Year 7, with higher concentrations in the earlier year-levels.

Not all schools need to be large though to achieve the same sorts of staffing profile or outcomes. A primary school located in Perth with approximately 190 enrolments and attendance rates and NAPLAN results well above national state averages has the following profile of staff deployment:



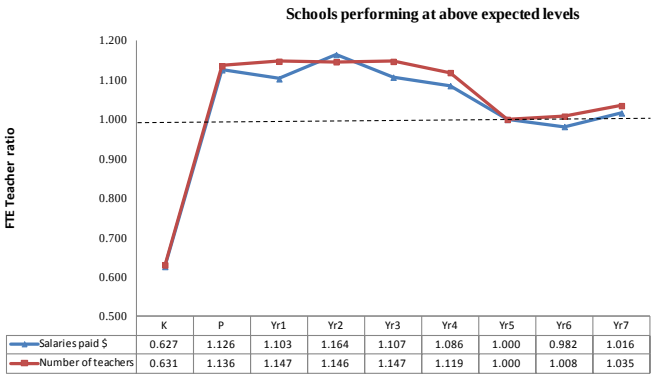
	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
City small school	0.65	1.13	1.17	1.24	1.22	1.08	1.00	1.01	0.99

The pattern is similar to the larger provincial school with more teachers deployed per capita in the earlier years.

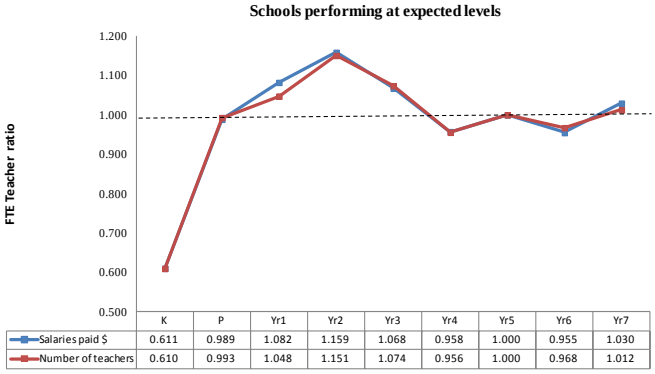
Figure 3.10 compares salaries against the number or quantity of staff used across year-levels. The comparison is useful in identifying how resources are used by schools because differences in relativities between cost and number provide one measure of difference in quality of resources. The comparison includes classroom teacher salaries and teacher duties other than teaching. The results are presented as relativities of expenditure, calculated for salaries by estimating the per capita costs for each year level (year-level expenditure divided by enrolments) and then calculating rates relative to the

Year 5 cost which is set to 1.00, and for staff numbers by estimating the per capita staff numbers for each year level (number of teachers divided by enrolments) and then calculating rates relative to Year 5 which is set to 1.00. Relativities were estimated by dividing the per capita resources for each year by the Year 5 rates.

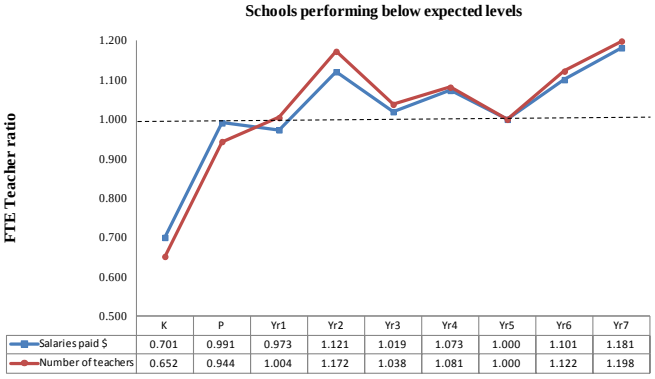
Figure 3.10 School performance and per capita FTE teacher ratios by year-level: salary cost ($) and staff numbers in primary school years compared, Year 5 treated as the base



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Salaries paid $	0.627	1.126	1.103	1.164	1.107	1.086	1.000	0.982	1.016
Number of teachers	0.631	1.136	1.147	1.146	1.147	1.119	1.000	1.008	1.035



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Salaries paid $	0.611	0.989	1.082	1.159	1.068	0.958	1.000	0.955	1.030
Number of teachers	0.610	0.993	1.048	1.151	1.074	0.956	1.000	0.968	1.012



	K	P	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
Salaries paid $	0.701	0.991	0.973	1.121	1.019	1.073	1.000	1.101	1.181
Number of teachers	0.652	0.944	1.004	1.172	1.038	1.081	1.000	1.122	1.198

The results suggest that schools that are effective in promoting student achievement and engagement are those which not only focus resources in the early years, they also match

the quantity of their focus with quality through deploying experienced teachers in the entry years, though also in the later years. There is some fluctuation in the patterns between Prep and Year 3 in schools performing at above predicted levels. For example in Year 2 the rate is higher for salaries than the quantity of resource, meaning that schools on average are using more experienced, or at least, more costly, teachers in this year-level relative to the number of teachers than they do in other year-levels. The interesting feature of schools performing at above predicted levels is the high amount and even number of teachers being used from Prep through to Year 3. This pattern sets this group of schools apart from the other two groups of schools.

As well as tending to concentrate their effort in the later years, schools performing below expected levels have consistent gaps between the ratios of quantity and cost from Year 1 to Year 3, and the salary cost ratios are lower meaning that less experienced, or at least lower paid teachers are being used at these year-levels, relative to other year-levels.

Effective secondary schools also use their resources strategically

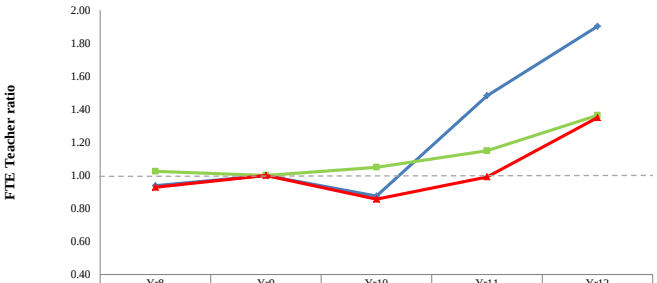
The same analyses have been applied to secondary schools, and are presented in Figures 3.11 and 3.12. Year 9 has been used as the base year. It is important to note that the patterns for Year 8 have been adjusted because of the 'two-thirds cohort' that entered the school system in 2002 following changes in the age at which children commenced Preparatory year. In 2010, this cohort was in Year 8 and the smaller cohort markedly increased per capita costs. The adjustments were made by using averages for Years 9 and 10.

In secondary schools, the main difference in staffing is in the final two years Year 11 and Year 12. Staff allocation at these year-levels is higher than the earlier years, largely reflecting smaller class sizes, the subject specialisations and program offerings of the senior school certificate, though electives operating in earlier year levels also require flexible class groupings.

Not all of the performance categories of schools display the same level of resource effort in the senior years. Strong and high performing schools use resources more evenly with a less marked year-level difference in resource allocation from Year 8 to Year 11. Year 9staffing per student in high performing schools is at an equivalent rate to Year 11. Only Year 12 sees a jump in these schools, due to smaller enrolments at that year-level and smaller class sizes. The pattern in low performing schools is quite different. Staff inputs per capita in Year 12 are almost double that of Year 9.

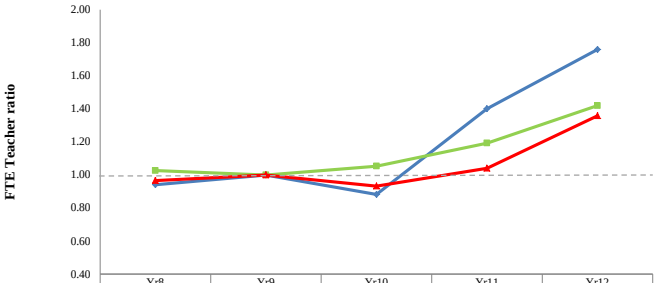
Figure 3.11 School performance and per capita FTE teacher ratios by year-level: secondary schools, Year 9 treated as the base

Classroom teachers



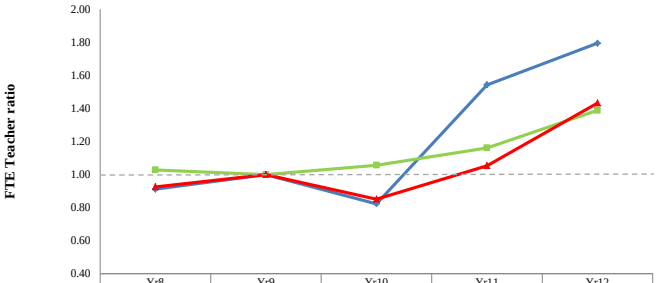
	Yr8	Yr9	Yr10	Yr11	Yr12
Below	0.94	1.00	0.87	1.48	1.90
At expected	1.02	1.00	1.05	1.15	1.36
Above	0.93	1.00	0.86	0.99	1.35

Classroom teachers and other duties



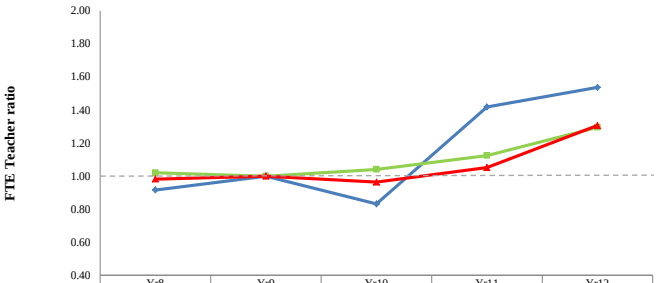
	Yr8	Yr9	Yr10	Yr11	Yr12
Below	0.94	1.00	0.88	1.40	1.76
At expected	1.03	1.00	1.05	1.19	1.42
Above	0.97	1.00	0.93	1.04	1.36

Classroom teachers, other duties and classroom support



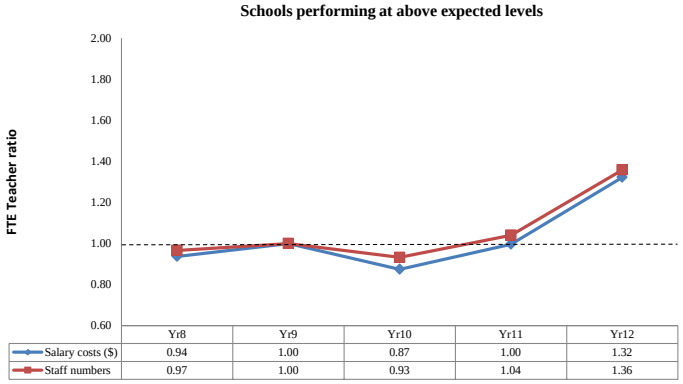
	Yr8	Yr9	Yr10	Yr11	Yr12
Below	0.91	1.00	0.82	1.54	1.79
At expected	1.03	1.00	1.06	1.16	1.39
Above	0.93	1.00	0.85	1.05	1.43

Classroom teachers, other duties, classroom support and non-teaching staff

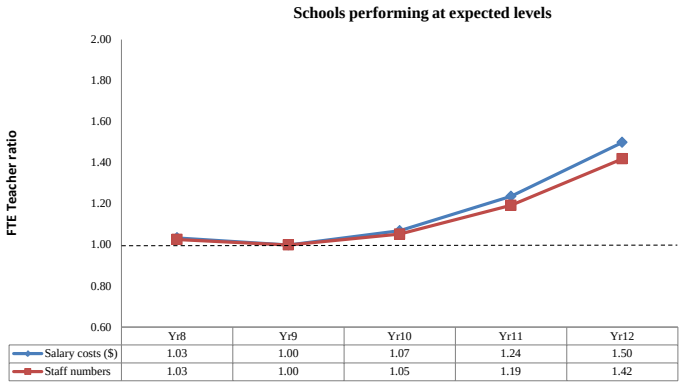


	Yr8	Yr9	Yr10	Yr11	Yr12
Below	0.92	1.00	0.83	1.42	1.54
At expected	1.02	1.00	1.04	1.12	1.30
Above	0.98	1.00	0.96	1.05	1.31

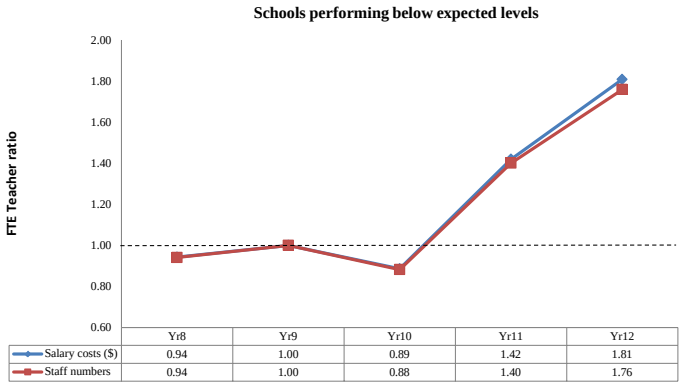
Figure 3.12 School performance and per capita FTE teacher ratios by year-level: salary cost ($) and staff numbers in secondary schools compared, Year 9 treated as the base



	Yr8	Yr9	Yr10	Yr11	Yr12
Salary costs ($)	0.94	1.00	0.87	1.00	1.32
Staff numbers	0.97	1.00	0.93	1.04	1.36



	Yr8	Yr9	Yr10	Yr11	Yr12
Salary costs ($)	1.03	1.00	1.07	1.24	1.50
Staff numbers	1.03	1.00	1.05	1.19	1.42



	Yr8	Yr9	Yr10	Yr11	Yr12
Salary costs ($)	0.94	1.00	0.89	1.42	1.81
Staff numbers	0.94	1.00	0.88	1.40	1.76

In low performing schools the gaps between FTE staffing in the senior years and the junior years are large. Higher relative staffing is applied in the later years, increasing each year from Year 10 to Year 12, with a marked jump from Year 10 to Year 11.

Looking at panel 4 of Figure 3.11, which includes all staffing apart from education support, the year-level differences are less marked, though the general differences in staffing patterns remain.

Figure 3.12 shows that generally across the three performance categories of schools there was little difference between the quantity and quality of resources used. For schools at or performing below benchmark levels, there is a small gap in Year 12 indicating that the teachers used at this year-level tend to have higher salaries; the relative costs of resources were higher than the relative quantity of resources used.

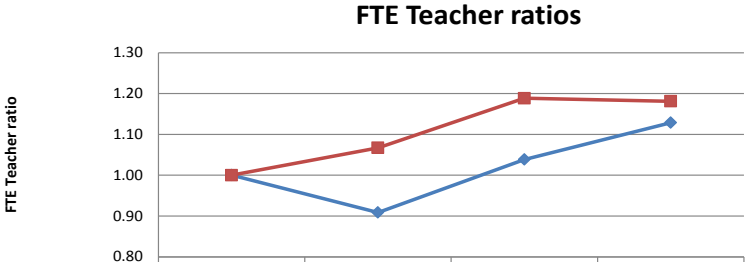
Comparing three high performing schools

It is worth comparing staffing in three different high performing schools (1) a large city senior high school, (2) a mid-size provincial senior high school and (3) a small rural senior high school.

The large city senior high school has over 1400 enrolments and strong results across a range of performance indicators attendance, TEE, retention, NAPLAN, transition. This school has substantial numbers at every year-level and is able to operate larger classes across year-levels. Its approach is to:

> "take the number of enrolments in each learning area and each subject, and staff accordingly. We avoid inefficient classes (i.e. unviable class sizes). Sometimes, because of priority some classes are staffed inefficiently, but generally we run to maximum efficiency. Upper school classes Years 11 and 12 tend to have 25 to 26 students per class. If there are any smaller classes, they are normally combined with another year group into a vertical arrangement".

Slightly bigger classes in the junior year-levels are supplemented with support staff, such as a learning support coordinator, to withdraw small groups of students to do intensive work when it is needed. The school's use of staff is different to that which the stage weights would suggest, with more even effort across the year-levels:

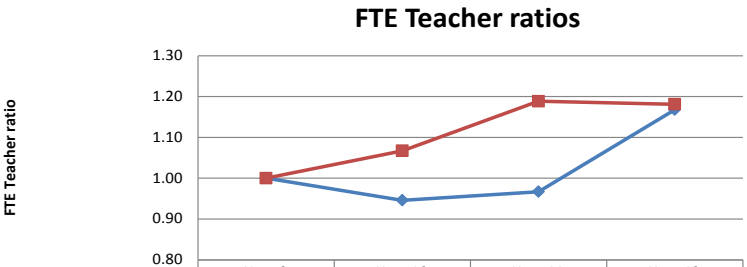


	Year 9	Year 10	Year 11	Year 12
City senior high	1.00	0.91	1.04	1.13
Stage weights	1.00	1.07	1.19	1.18

The high performing large city senior high school can be flexible in its approach to staffing because of size. But smaller schools can also be strategic in these ways. The medium sized provincial school with an enrolment of around 580 students and an SEI in

the mid-90s has about 6 per cent of students from indigenous backgrounds. The school has delivered strong results with high retention rates to Year 12 (over 90 per cent), attendance rates close to the state average, a median TEE score 10 points above the state average (despite high retention which maintains student diversity) and with up to only half the percentages of students not meeting national benchmarks across the Year 9 NAPLAN dimensions compared to the state averages. The school is concerned about the tendency for younger students to become disengaged. It views Years 8 and 9 as areas of high need, followed by vocational education students. It has implemented an advisory program for disengaged students in Years 9 and 10 and tries to ensure smaller classes at these year-levels. It has implemented weekly parent contact and involvement, regular mentoring and individualised learning plans for every student.

Use of staff at this school also differs from what the stage weights would suggest, with resources more evenly distributed across year-levels:

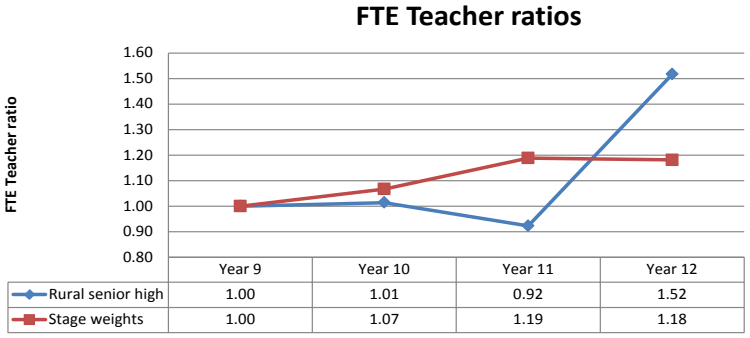


	Year 9	Year 10	Year 11	Year 12
Provincial senior high	1.00	0.95	0.97	1.17
Stage weights	1.00	1.07	1.19	1.18

Even small schools can follow similar patterns, though the small size of final year cohorts makes it more of a challenge. A small rural senior high school with about 350 enrolments, an SEI near 90 and an indigenous population of almost 20 per cent has achieved above expected levels of performance in terms of retention, particularly for indigenous students, and TEE scores. The school has had to be innovative in the way it approaches classes:

> "For a small HS we offer a large curriculum to give the kids opportunities with a high success rate. We can cater for small groups by creating links to other schools via video conferencing to complete certificate courses. This requires a lot of students out of class, so mainstream class teachers have to spend additional time with these kids to catch up. The school relies on goodwill of staff and we run additional support and activities such as study outside of normal school hours. We have to put a lot of resourcing into the senior years, particularly Year 12 because of subjects with small class sizes but we try to balance this with extra support in the earlier years."

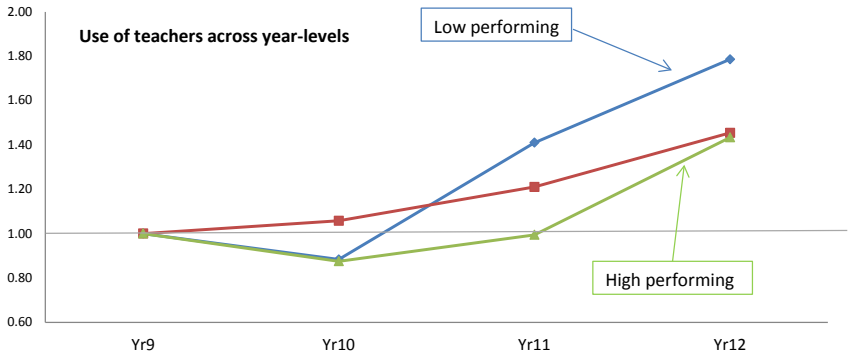
The impact of the small classes in Year 12 is evident in the FTE teacher ratios for that year-level. However, the school has a pattern that is more even across the other years:



	Year 9	Year 10	Year 11	Year 12
Rural senior high	1.00	1.01	0.92	1.52
Stage weights	1.00	1.07	1.19	1.18

Schools with small enrolments are limited in the way they use their resources

Small enrolments driven by competition can limit good practice. Some schools with declining enrolments, often by-passed by aspirant families and having to deal with residualised concentrations of disadvantaged students, are forced to offer very small classes in the senior years which multiplies costs and drains resources from other year-levels where they are needed. A funding model alone cannot really deal with this problem, which requires broader policies on provision, but nor should the model reflect it with inflated senior-year loadings:



It is not only schools suffering from declining enrolments where the deployment of teachers is associated with poor student outcomes. Some schools not restricted by small enrolments are still not performing well, and this can be reflected in their approach to staffing. For example, a larger senior high school with almost 1,000 students performing

well below what might be expected across a range of indicators including NAPLAN, is allocating 1.55 teachers in Year 12 and 1.3 teachers in Year 11 to every teacher in Year 9. The school itself is aware of its choices, but feels constrained:

> "We would like to reduce class sizes in Years 8 to 10 to better deal with the issues we face student diversity, students well behind when they enter the school, lack of parental support despite being a high SEI school but we can't because we have to use the money for student support services youth worker, chaplain, school nurse, school psychologist in order to manage adolescence issues and for maintaining the programs in the senior years".

Conclusion

If effective schools that is schools that gain higher than expected student outcomes after taking account of student intake and context are any guide then the year-level weights for resource allocation would stress the importance of the early years while recognising the impact of developmental needs in the secondary years associated with a differently organised program. The rationale behind such weights is platform building the early years of primary school, the early years of secondary schooling, with a concerted effort to address gaps in achievement levels and differences that are manifest in the later years.

In terms of pedagogy and developmental needs, some consideration ought also be given to the middle years of schooling and the transition period from primary to secondary. Research on effective secondary schools points to the role of maintaining more familial student management and organisation in the early secondary years, with a stronger focus on pastoral care and the quality of student-teacher relations.

4. Addressing the equity challenge

To address additional need associated with student characteristics, Western Australia provides a range of supplementary resources to schools with disproportionately high numbers of students who are limited by social and economic disadvantage and at risk of not succeeding in school. The aim is to give schools extra funding for implementing strategies and initiatives that can address the additional needs of disadvantaged students and help improve their learning and outcomes. This approach is consistent with many other systems around the world and is significant because it is designed to deliver differential, not necessarily equal, allocations based on differential student need. The way that additional resources are provided in Western Australia, which is not necessarily consistent with other jurisdictions, is through loadings in the staffing entitlement as well as the school grant and through special purpose payments tied to targeted programs.

This section looks at the main measure which is used to help allocate additional resources, the Socio-economic Index (SEI). There are several questions concerning the SEI and its application in the allocation of resources to meet additional need associated with student disadvantage. The first relates to how accurately or how well the SEI works as a device for measuring social disadvantage. Does SEI capture socio-economic disadvantage in the most appropriate way? A second question relates to how well the indicator works to distribute funds. Do the current formulas for allocation work effectively? A third question relates to the impact of funding. How much difference does SEI-based funding make to school performance and student outcomes?

What other systems do

Most systems, here and overseas, provide supplementary funding for additional student need and do so using a variety of measures of student disadvantage and different levels of funds. In the United Kingdom, for example, additional resources are allocated to schools for students who have been identified as requiring extra support to meet the costs associated with such things as learner support, supervisory help, teaching and communication support needs. The additional resources are allocated from central government and from Local Education Authorities. In the past, the main supplementary funding for social disadvantage was available under the program of Additional Educational Needs (AEN) which provided a per student amount over and above base per student funding. The amount of additional funding in 2005 was $2276 per student, up to

50 per cent of the base or core per student amount, depending on the stage of schooling. The funding supplement has been altered in recent years to include a central government scheme entitled *Student Premium* which is paid directly to schools and is set at $770 per eligible student.

The main indicator used by central government to assess social disadvantage (described in the UK as 'deprivation') is eligibility for students to receive free school meals. Eligibility for free school meals is based on family income, and so is mainly a measure of income and poverty. It is this measure that is solely used to determine eligibility for the *Student Premium*. Local Education Authorities, which also channel funds to schools, can use other indices but it is usually a mixture of:

- Free School Meal eligibility based on parental income where parents have to apply for free school meals at their school or LEA and prove they are eligible by producing evidence of income;
- Tax Credit Indicator students in families in receipt of out of work tax credit;
- MOSAIC or ACORN commercial demographic classifications of postcodes into types based on census and other information using cluster analysis and other statistical methods. They are designed to identify groupings of households based on consumer behavior; and
- Low prior attainment most often measured at the end of key stages of learning.

Up to 18.5 per cent of primary school students and 15.4 per cent of secondary students were eligible for free school meals (FSM) in 2010 in the UK. The level of supplementary funding for schools depends on the concentration of FSM students. Some Local Education Authorities impose thresholds to ensure that the funding is targeted to the schools with highest concentrations.

In the United States, according to a 2009 survey of state education systems, 34 states fund students from low income families or students falling behind on assessed achievement standards (Verstegen and Jordan, 2009). In Kentucky, the eligibility criterion is based on students eligible for a free-lunch program funded by the federal government (federal free-lunch). In Michigan, it is eligibility for free breakfast, lunch or milk. In Nebraska, it is students qualified for free lunches/milk, or students under 19 years of age living in a household with adjusted-gross income less than $15,000, whichever is greater. In Iowa, eligibility is based partially on both free- and reduced-lunch count in addition to budget enrollment of the school district. Texas supports students eligible for free- and reduced-cost lunch and students who are pregnant. New

York provides state support for students who are at risk of not meeting learning standards. Likewise, South Carolina provides funding for students who fail to meet statewide standards in reading, writing, and math, or who do not meet first grade readiness-test standards.

Weights vary but range between doubling the level (100 per cent) of per student base funding as in Minnesota, to five per cent as in Mississippi. The average, and most frequent, level of supplementation across states is an additional 25 per cent in funding for low-income students with eligibility based on either federal free- or reduced-price lunch status or both. Connecticut provides an additional 25 per cent; Georgia, 31 per cent; Hawaii, 10 per cent; Louisiana, 19 per cent; Maine, 20 per cent; Michigan, 11.5 per cent; Minnesota, 100 per cent for free-lunch recipients and 50 per cent for reduced-lunch recipients; Missouri, 25 per cent; Oregon, 25 per cent; South Carolina, 26 per cent; and Texas and Vermont, 25 per cent.

New York has implemented a needs-based funding approach, similar to that of several states, and uses prior student achievement to weight funding for middle schools and high schools. Funding based on achievement could lead to perverse funding consequences, such as rewarding schools for poor performance. To avoid this, in New York students receive additional weights based on their achievement at entry to a school rather than as they progress. In this way a school receives additional funding for enrolling students with poor skills, but it does not lose money for success in educating them. There are two funding levels a higher achievement weight for students "well below standards," and a lower one for students who are below grade level, but closer to proficiency ("below standards"). Elementary schools, which do not have available standardized assessments in the same way for entry students, use poverty as a proxy for low achievement. The measure of poverty that is used for weights is the proportion of students receiving free lunch or receiving income assistance. Funding for students in elementary schools who meet the criteria is $909 per student (about 25 per cent of base per student funding); for middle school students well below standards the funding is $1894 per student (about 40 per cent of base per student funding) and in high schools it is $1515 per student (about 40 per cent of base funding).

Jurisdictions across Australia measure social disadvantage in different ways. In South Australia, social need has been measured using the Index of Educational Disadvantage (IED) which was introduced in 2001 to allocate resources to schools to address the educational needs of students from low socio-economic backgrounds. The IED uses four equally weighted dimensions: (1) parental income, (2) parental occupation and education, (3) numbers of indigenous enrolments and (4) student mobility. The weightings are

derived using a principal component analysis which summarizes into a single scale the mutual correlations across the different dimensions. The dimension items are derived from two main sources: (1) school census data for the numbers of indigenous enrolments and student mobility, and (2) ABS census data for information on income, occupation and education. The ABS data are SEIFA scores based on census collection districts and the scores for schools are derived by mapping the addresses of students attending a school to the ABS census collection districts from which a school draws its students. The weighted average of the relevant data for the collection districts from which the school draws its students is used as the score.

IED scores are used to group schools into seven categories of relative disadvantage, with all schools within a category receiving the same rate of allocation. Schools from Category 1 to 4 receive additional per student funding which range from $190 per student in Category 1 schools in 2009 to $75 per student in Category 4 schools. The IED is also used to provide supplementary funding across a range of other funding programs, such as the School Card Grant (educational maintenance allowance of $197 for primary and $263 for secondary students) and Social Inclusion Supplement (grant to improve learning of low SES students).

In New South Wales, there are two schemes of funding for social disadvantage, the Priority Schools Funding Program (PSFP) and the Priority Action Schools Program (PASP), both located under the umbrella *Priority Schools Program*. The PSFP provides additional assistance to school communities to reduce the achievement gap for students in schools with high concentrations of students from low socio-economic status backgrounds. It uses a social disadvantage index compiled from data collected in a voluntary quadrennial survey of parents. The survey collects information including occupational status of parents or caregivers, hours worked and educational qualifications. Information on a school by school basis on numbers of indigenous students, numbers of single parents, numbers of parents in employment, numbers unemployed or not in the labour force, numbers of parents on income support, the educational attainment of parents and their occupational status is used to identify levels of disadvantage across schools. A factor analysis procedure is employed to provide school weights to help rank schools on the basis of their factor loadings.

Funding for the PSFP is applied to schools that are under a threshold score and the score usually means that roughly 25 per cent of schools receive support. For funded schools, allocations of resources are weighted according to the PSFP Index score. Schools receive PSFP grants through a formula made up of a base grant and a component which reflects student enrolments. Staffing supplementation is also provided to increase the ratio of staff

to students and reduce class sizes. Further support is provided to PSFP schools by regionally-based consultants and partnership officers who work within regional teaching and learning teams to support Priority Schools and networks.

Tasmania, in the past, has used the Educational Needs Index (ENI) to measure need and allocate funds. The ENI was calculated annually and was comprised of two components: (1) the proportion of the school's population receiving assistance with the cost of levies and text books under the Student Assistance Scheme (STAS), a means tested allowance based on parental income, and (2) an SES score for the school derived from the SES characteristics of the areas from which the school's enrolments are drawn, obtained using Census Collection District geo-coded addresses of students which are allocated a score from the Index of Relative Socio-economic Disadvantage, a scale that is part of the Australian Bureau of Statistics' Socio-Economic Indexes for Australia (SEIFA). The two components of the ENI are used to capture SES disadvantage. Income and poverty are key elements as they are directly measured through the numbers of students receiving STAS (which is income-tested). IRSED also captures income levels of communities, though in combination with characteristics of social disadvantage related to education, occupation, employment, housing status, and English fluency.

It is difficult to assess the total level of funds delivered through the ENI in Tasmania because resources are delivered through a staffing entitlement weighted by ENI and a school grant that contains various elements that are also weighted by ENI, and some with thresholds to concentrate the funds to the most disadvantaged schools. One of the main programs is the Commonwealth funded literacy program and in 2008 the program delivered an average of $157 additional per capita funding for primary schools, ranging from $60 per student to the school with the lowest ENI to $256 per student for the school with the highest ENI score.

The indexes used in South Australia and New South Wales are multiple indexes of social advantage and disadvantage attempting to capture various dimensions of social need. They are broader than traditional socio-economic (SES) indexes since they also attempt to capture other dimensions such as race (indigenous population), mobility and family structure (single parent and family status). The indexes in Tasmania and South Australia are based on social area indexes (ABS Census data linked to collection districts) and are not based on the characteristics of student's individual family background.

Victoria provides supplementary funding for social disadvantage using a single element SES index, Student Family Occupation (SFO). The funding aims to target "students whose readiness to learn is affected by a range of circumstances, including prior

educational experiences and family or other personal circumstances. Consequently, SFO funding supports programs that focus on students at risk of not achieving success at school with particular emphasis on students with literacy problems" (DEECD, 2011).The SFO component of the Student Resource Package provides funding to schools through the SFO Index. It is a single element index based on the occupational status of parents. It is constructed using individual student data from information schools collect and provide at the time of the annual school census. Five occupational categories are used with a different weighting applied to each category. The index ultimately provides a density score for each school based on the weighted concentration of students from low status families according to parental occupation. SFO funding is allocated by subtracting the SFO score (0 to 1) from the statewide median (.5) and then multiplying the result by enrolments and a per capita price ($1,540 in 2011). For example, a school with an SFO score of .8 and 1000 students would have received $462,000 in supplementary funding, whether primary or secondary. The same sized school with an SFO score of .54 would have received $61,000. The median score for the state becomes the funding threshold. This means that approximately 50 per cent of schools receive funding. The SFO budget in 2009 was roughly $51 million.

For the federal government, the Australian Curriculum, Assessment and Reporting Authority (ACARA) has developed a scale of social advantage which can be used as a measure of student background characteristics the Index of Community Socio-Educational Advantage (ICSEA). The scale was developed as a measure of school student intake characteristics to be used for comparing school performance on NAPLAN (see ACARA, 2011). It was devised using statistical techniques to find the combination of variables that have the strongest association with NAPLAN results. The variables that are used to derive ICSEA values include direct student-level parent occupation and education data, indirect measures of the same features based on ABS census data for social areas, Accessibility/Remoteness index scores (ARIA), percentage of disadvantaged students from language backgrounds other than English (LBOTE), and the percentage of indigenous students. The elements of ICSEA are weighted differently to produce a final value that is strongly correlated with NAPLAN results.

ICSEA may be used for a variety of purposes in the future, as it is one of few measures of social advantage and disadvantage that is derived in the same way across all states and territories. ICSEA was designed to obtain a fairer way of comparing schools on NAPLAN literacy and numeracy skills tests and, therefore, was not designed for funding purposes and the allocation of funds to target need. It may not necessarily be the best or most sensitive measure within jurisdictions.

The SEI

Under current arrangements, public schools in Western Australia that serve disproportionately large numbers of students from disadvantaged backgrounds receive additional support through their staffing entitlement, school grant and supplementary programs. The SEI is the instrument used to rank schools by relative need for the purposes of weighting and allocating resources to deliver additional support.

The SEI is constructed using ABS census collection district data linked to student addresses, and school data on indigenous students. It is constructed at CD level using the following weightings:

	Data source	Weighting
Education levels	ABS census	x 2
Occupational status (inc unemployment)	ABS census	x 2
Indigenous students	Per cent in school	x 2
Single parent family	ABS census	x 1
Family income	ABS census	x 1

The first three elements share an equal weighting of 25 per cent each in the index. The index is derived by mapping student addresses to census collection districts and using the average characteristics of collection districts from which students are drawn to estimate values, using the relevant weights listed above. The index contains some dimensions that are often collected in classical SES scales, such as education, occupation and income. But is also contains dimensions that are based on family structure (single parent family) and race (indigenous students).

School views on the SEI

Principals participating in the initial school survey held differing views on the SEI as a measure of social advantage or disadvantage. Some (approximately 30 per cent) reported that they felt that the measure was as good as any other measure for capturing relative differences and seemed to be accurate for their school.

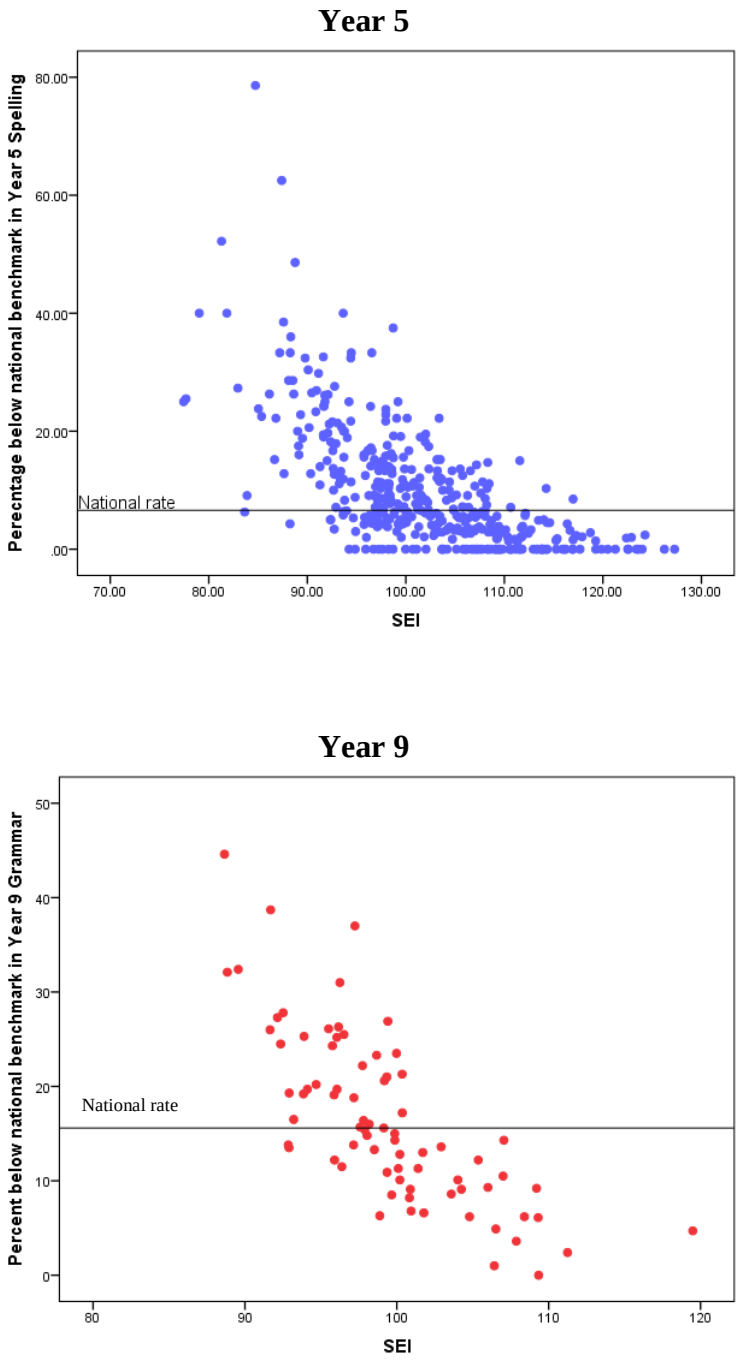
For others, however, there were various concerns captured in the following points:

- Uncertainty about how the measure works ("we have a different SEI to the school next door and we are unsure why", "SEI score puts us in a different group to that of ICSEA")
- Concerns that the measure is not 'linear' and the gaps in the scale don't reflect the real differences between schools ("Schools with the lowest SEIs are much more disadvantaged than those just above them on the scale")
- Concern about the use of area measures over direct individual student measures ("the SEI includes basically everyone in our area, but the affluent kids go to private and other schools", "SEI may be increasing, due to gentrification, but families coming to school are poorer")
- SEI suffers because the data are from the 5-yearly national census and become dated, no longer accurate for some areas ("SEI is taken from the census but places such as where this school is located change more rapidly than that", "SEI should be measured more frequently – annually, not every 5 yrs as our area has changed and is not reflected")
- Other factors that affect performance aren't included in the measure, such as transience or mobility and ESL
- SEI doesn't accurately reflect needs in mining towns ("average income can be inflated by a small number of high income earners", "salaries and income in this mining town are high but parental interest in education and education values is poor")

Quality of the SEI measure

There is no doubt that SEI is strongly correlated with student performance. Figure 4.1 reports the percentages of students below the national benchmarks in NAPLAN Year 5 spelling and Year 9 grammar and punctuation. School rates are plotted against the SEI with the Year 5 results displayed for schools with more than 100 enrolments and the Year 9 results for all senior high schools. The results show strong relationships with SEI. In general, the higher the SEI value the lower the percentage of students below the national minimum benchmark standard.

Figure 4.1 Students below national benchmarks in Year 5 Spelling and Year 9 Grammar, by SEI: primary schools (more than 100 enrolments) and senior high schools, 2010



The strength of the relationship between NAPLAN results and SEI is also revealed in the levels of variance explained by SEI in the NAPLAN results. SEI accounts for almost two-thirds of the variance in mean Year 5 NAPLAN spelling (R^2=0.65) and over 60 per cent of the school differences in Year 9 mean NAPLAN grammar scores (R^2=0.61).

If student disadvantage is a strong predictor of achievement and other student outcomes then based on the strengths and directions of relationships, SEI would appear to be a fairly robust instrument for measuring social advantage and disadvantage. But are the dimensions accurately captured and how does it compare against other measures?

A frequent comment from school principals was a concern about the use of area (census collection district) measures rather than direct individual student data in the construction of the index. Several of the indicators used to compile the SEI are area-based measures of social disadvantage education levels, occupation and employment, family income. Student addresses are used to identify each student's ABS collection district. Then the collection district is used to assign an index score. In this way average area-based values rather than individual-level data are used in the construction of the index and therefore in the measurement of school advantage and disadvantage. Research comparing the strength of area-based measures and direct individual student based measures of SES in explaining student achievement suggests that direct student-based measures are more highly correlated with student outcomes. Ainley et al. (1995), for example, derived individual and area-based measures of SES from the same data set of students and found that individual student-based measures of SES accounted for almost double the amount of variation in student achievement as the area-based measure of SES.

Area effects can sometimes influence patterns in unusual ways. For example, it is possible for a low income family to live in a relatively well off neighbourhood. Similarly, families may choose to by-pass local schools and send their child to a school in another location effectively applying the characteristics of their own area to the school that is not in their neighbourhood.

Geo-coding is the technique used to map student addresses to Census collection districts. Address matching in urban areas has been found to be fairly robust, but it is far less thorough and reliable in rural areas partly because of the use of roadside mailbag addresses and partly because of the much larger geographic areas contained in collection districts. Values derived using collection districts may be far less accurate in rural than in urban areas.

Area-based measures are often used where individual level data on student background are not available. However, where individual-level data are available they are preferred because of their greater sensitivity in more accurately measuring the SES backgrounds of students attending a school. With the more comprehensive collection of direct individual student data on parental occupation and education, it is more appropriate for this data to be used in the construction of an advantage or disadvantage index.

Comparison with other measures

There are various options available when it comes to indicators for measuring social composition. It is possible to compare the SEI with several other measures that could be used for Western Australia. One of these measures is ICSEA which is derived by ACARA on an annual basis for use in the NAPLAN reporting process. ICSEA for 2011 was derived using direct individual level data, where available, as well as school data such as concentrations of indigenous students and disadvantaged LBOTE students, and remoteness location. ICSEA and SEI are both multiple or omnibus indexes because they measure a variety of dimensions of advantage and disadvantage in the one scale. Also available for comparison are various possible combinations of direct individual level data available on parental occupation and education provided to ACARA. For current purposes three indexes were created for comparison:

(1) an index of parental education using data on school completion and post-school attainment

(2) an index of occupational (and employment) status

(3) a combined index of parental education and occupation.

Data to create the indexes were those used for NAPLAN and therefore relate to direct individual student information for students in the year-levels relevant to NAPLAN: Year 3, Year 5, Year 7 and Year 9. This means that school level values can be generated but reflect the composition of the different year-levels.

For the parental education index, the levels of education were treated as years of attainment from 9 to 16. This method of creating a single education scale based on completed years of education is often used in educational research (see, for example, Kelly and Evans, 1996; Statistics Canada, 1998). The scale was constructed with the following values:

Value	
16	Bachelor degree or above
13	Advanced Diploma/Diploma
12	Year 12 or equivalent
11.5	Year 11 or equivalent plus post-school certificate
11	Year 11 or equivalent
10.5	Year 10 or equivalent plus certificate
10	Year 10 or equivalent
9	Year 9 or equivalent or below

Scores for parents were summed to provide a single parental education scale. Where data were available for one parent, but not the other, the score was doubled. The school score for parental education was constructed as the mean of the recoded combined individual scores.

For the Occupation index, the 5 broad categories were recoded using status weights. The scale scores reflect differences in relative status for the categories as reflected in occupational status scales, such as the ANU4 scale (Jones and McMillan, 2001). Scores for parents were summed to provide a single parental occupation scale. Where data were available for one parent, but not the other, the score was doubled. The school score for parental occupation was constructed as the mean of the recoded combined individual scores.

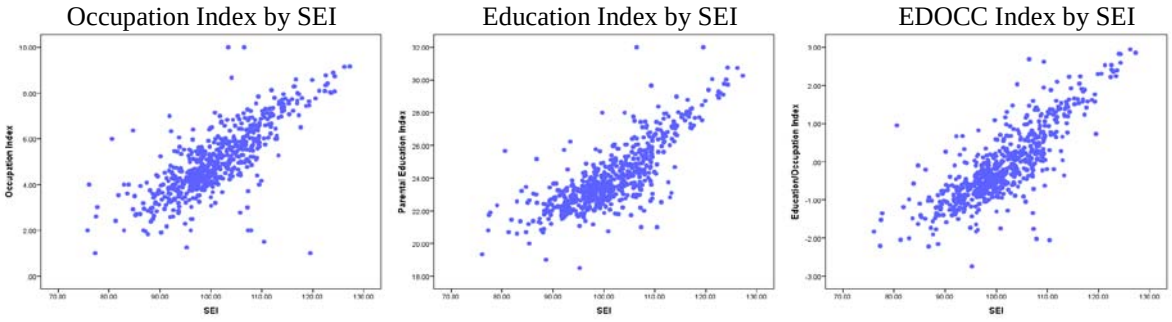
The education and occupation combined index (EDOCC) was constructed by deriving standardised scores for each of the component elements and summing the components, thereby giving equal weight to both components.

Figure 4.2 presents a comparison of the distributions of schools across the various scales, each mapped against the existing SEI. There is some scatter in the relationship of SEI to the education and occupation indexes, though the patterns and directions are fairly consistent.

However, there are some schools which have low SEI values, but which have, on average, students with parents who are well educated and with fairly high status jobs. For example, several schools have an SEI value below 85 but are in the middle of the rank in terms of parental education and occupation. Alternatively, there are quite a few schools which score highly on the SEI scale (well over 100) that are at the bottom of the education and occupation indexes, meaning that the parent body is currently assessed as

being highly advantaged but the parents have very low levels of educational attainment and/or the parents are in low status occupations or unemployed.

Figure 4.2 Comparison of separate SES scale distributions, by SEI: primary schools, senior high schools and district high schools



One way to compare the strength of the different measures is to look at the relationships with school performance as measured by student outcomes. Differences in concentrations of high need students can have a marked impact on the effectiveness of schools in promoting successful students outcomes. How well do the different measures capture this?

Table 4.1 reports the correlations between a range of school performance measures (Year 5 NAPLAN results in numeracy, writing and reading, Year 9 achievement on the same NAPLAN dimensions, attendance rates, median TEE scores and retention rates to Year 12) and the different socio-economic indicators: education, occupation, EDOCC, ICSEA, and SEI.

It is important to note in comparing the results that the indicators for education and occupation are based on data from cohorts of students in particular year-levels (rather than the whole student body). This means that the school values for primary schools will generally be fairly robust because they contain 3 year-levels. For secondary schools, however, the values are based only on Year 9. Work undertaken on data from Victoria comparing measures constructed using 'whole of student body' census data collected annually and measures using only year-level student data revealed that in correlations with student performance there's up to 10 to 20 per cent difference in the strength of correlations depending on the NAPLAN dimension.[1] 'Whole of student body' data provide indicators that are stronger predictors of school performance. The results in Table

[1]This work was carried out by Stephen Lamb using data on parental education and occupation from the 2010 NAPLAN and from the annual school census for Victorian public schools.

4.1, therefore, are likely to under-report the strength of correlations with the education and occupation indexes.

Table 4.1 Correlations between school performance and social indexes

Performance measure	Education	Occupation	EDOCC	ICSEA	SEI
			Primary schools		
Attendance rate	0.415	0.424	0.408	0.687	0.590
Indigenous attendance rate	0.165	0.194	0.154	0.286	0.248
NAPLAN Year 5 Numeracy	0.643	0.640	0.650	0.764	0.766
NAPLAN Year 5 Reading	0.662	0.701	0.687	0.784	0.765
NAPLAN Year 5 Writing	0.620	0.641	0.633	0.715	0.697
			Secondary schools		
Attendance rate	0.473	0.348	0.507	0.735	0.723
Indigenous attendance rate	0.368	0.252	0.376	0.627	0.604
Retention to Year 12	0.384	0.290	0.391	0.552	0.566
Median TEE Score	0.463	0.360	0.426	0.452	0.378
NAPLAN Year 9 Numeracy	0.746	0.458	0.749	0.771	0.692
NAPLAN Year 9 Reading	0.792	0.462	0.826	0.844	0.770
NAPLAN Year 9 Writing	0.719	0.422	0.753	0.818	0.727
			District High Schools		
Attendance rate	0.505	0.564	0.526	0.902	0.849
Indigenous attendance rate	0.458	0.435	0.424	0.769	0.748
Retention to Year 12	0.320	0.300	0.320	0.360	0.300
NAPLAN Year 5 Numeracy	0.537	0.408	0.460	0.688	0.652
NAPLAN Year 5 Reading	0.525	0.534	0.532	0.800	0.781
NAPLAN Year 5 Writing	0.360	0.356	0.303	0.715	0.699
NAPLAN Year 9 Numeracy	0.513	0.470	0.531	0.659	0.686
NAPLAN Year 9 Reading	0.539	0.453	0.533	0.767	0.751
NAPLAN Year 9 Writing	0.502	0.431	0.508	0.723	0.688

Consistently, the ICSEA and SEI scales show stronger correlations with attendance. This is not surprising because attendance rates in Western Australia are highly correlated with indigenous enrolments and the ICSEA and SEI measures have loadings for indigenous students which the education and occupation indexes do not. ICSEA has higher correlations than SEI for attendance in all three types of schools, though the differences are only marginal. This may reflect the use of current direct student data in the ICSEA scale.

The education and occupation indexes also show moderately strong correlations with attendance particularly in district high schools, but also in primary and secondary schools, reflecting the relationship between student engagement and these measures.

Keeping in mind that the education and occupation indexes are based only on one year-level for secondary schools, the results for retention to Year 12 show higher correlations for ICSEA and SEI in secondary schools, but only for ICSEA in district high schools where the education and occupation indexes reveal similar sized correlation estimates.

One point to note for secondary schools is the result for TEE. The index with the highest correlation is Education (.463) and the results for Education and EDOCC are both larger than the SEI estimate. This result may reflect the fact that, due to the effects of differential retention, performance at this level is less affected by indigenous enrolments, remoteness and income. It highlights the strong role than parental education (and occupational background to a lesser extent) plays in influencing academic achievement and success.

The patterns for TEE hold largely also for senior high school Year 9 NAPLAN achievement in numeracy, reading and writing. The correlation estimates for EDOCC are stronger than those recorded for SEI and marginally lower than for ICSEA. In district high schools and primary schools the correlations with NAPLAN are marginally weaker for the education and occupation indexes compared to ICSEA and SEI, though still high (generally above 0.6 for primary and 0.5 for district high schools).

Indexes may work differently depending on school size (number of enrolments). This is partly because of the numbers of students used for the purposes of devising school level values. Small numbers of student can cause large fluctuations from year to year and not as accurately capture the student intake or school context. To look at this, Table 4.2 presents the same list of correlations between performance and the different indexes. The results are reported for senior high schools and separate the schools into four groups based on school size: (1) schools with fewer than 300 students, (2) schools with between 300 and 499 enrolments, (3) schools with between 500 and 799 enrolments, and (4) schools with more than 800 enrolments.

Generally, the same sorts of relationships as reported for Table 4.1 apply. However, for small schools those with fewer than 300 students and those with between 300 and 499 students there's little difference between the education and occupation indexes and ICSEA and SEI in terms of the correlations with the cognitive measures of school performance Year 9 NAPLAN scores in numeracy, reading and writing.

Table 4.2 Correlations between school performance and social indexes, by school size: senior high schools

	Education	Occuption	EDOCC	ICSEA	SEI
Performance Measure					
			Less than 300 students		
Attendance rate	0.530	0.460	0.530	0.734	0.770
Indigenous attendance rate	0.490	0.470	0.510	0.674	0.734
Retention to Year 12	0.786	0.200	0.450	0.630	0.590
Median TEE Score					
NAPLAN Year 9 Numeracy	0.560	0.743	0.687	0.580	0.676
NAPLAN Year 9 Reading	0.850	0.849	0.851	0.798	0.895
NAPLAN Year 9 Writing	0.719	0.687	0.711	0.826	0.920
			300-499 students		
Attendance rate	0.090	0.280	0.210	0.558	0.578
Indigenous attendance rate	0.130	0.030	0.080	0.390	0.350
Retention to Year 12	0.310	0.020	0.240	0.090	0.360
Median TEE Score					
NAPLAN Year 9 Numeracy	0.110	0.140	0.230	0.230	0.120
NAPLAN Year 9 Reading	0.565	0.662	0.738	0.660	0.680
NAPLAN Year 9 Writing	0.440	0.563	0.599	0.600	0.626
			500-799 students		
Attendance rate	0.380	0.300	0.320	0.654	0.621
Indigenous attendance rate	0.070	0.090	0.010	0.370	0.408
Retention to Year 12	0.100	0.070	0.070	0.617	0.390
Median TEE Score	0.220	0.270	0.260	0.250	0.130
NAPLAN Year 9 Numeracy	0.504	0.523	0.540	0.690	0.662
NAPLAN Year 9 Reading	0.524	0.540	0.576	0.618	0.613
NAPLAN Year 9 Writing	0.419	0.340	0.409	0.680	0.629
			800+ students		
Attendance rate	0.656	0.387	0.728	0.884	0.854
Indigenous attendance rate	0.416	0.196	0.447	0.692	0.598
Retention to Year 12	0.624	0.270	0.633	0.722	0.660
Median TEE Score	0.668	0.244	0.623	0.765	0.678
NAPLAN Year 9 Numeracy	0.822	0.269	0.836	0.890	0.694
NAPLAN Year 9 Reading	0.837	0.272	0.860	0.912	0.711
NAPLAN Year 9 Writing	0.784	0.314	0.843	0.875	0.66

Scales as funding indexes

It is one thing in looking at the robustness of social indicators to compare how well they relate to school performance, it is another to consider how well they work in the allocation of resources. ACARA has made it clear that they have designed ICSEA for the

purpose of making fairer comparisons across schools in student achievement and have focused on constructing an index of social advantage which correlates highly with NAPLAN scores. The scale and scale intervals have not been designed for the purpose of allocating funds and the scale may not be the best indicator for doing so.

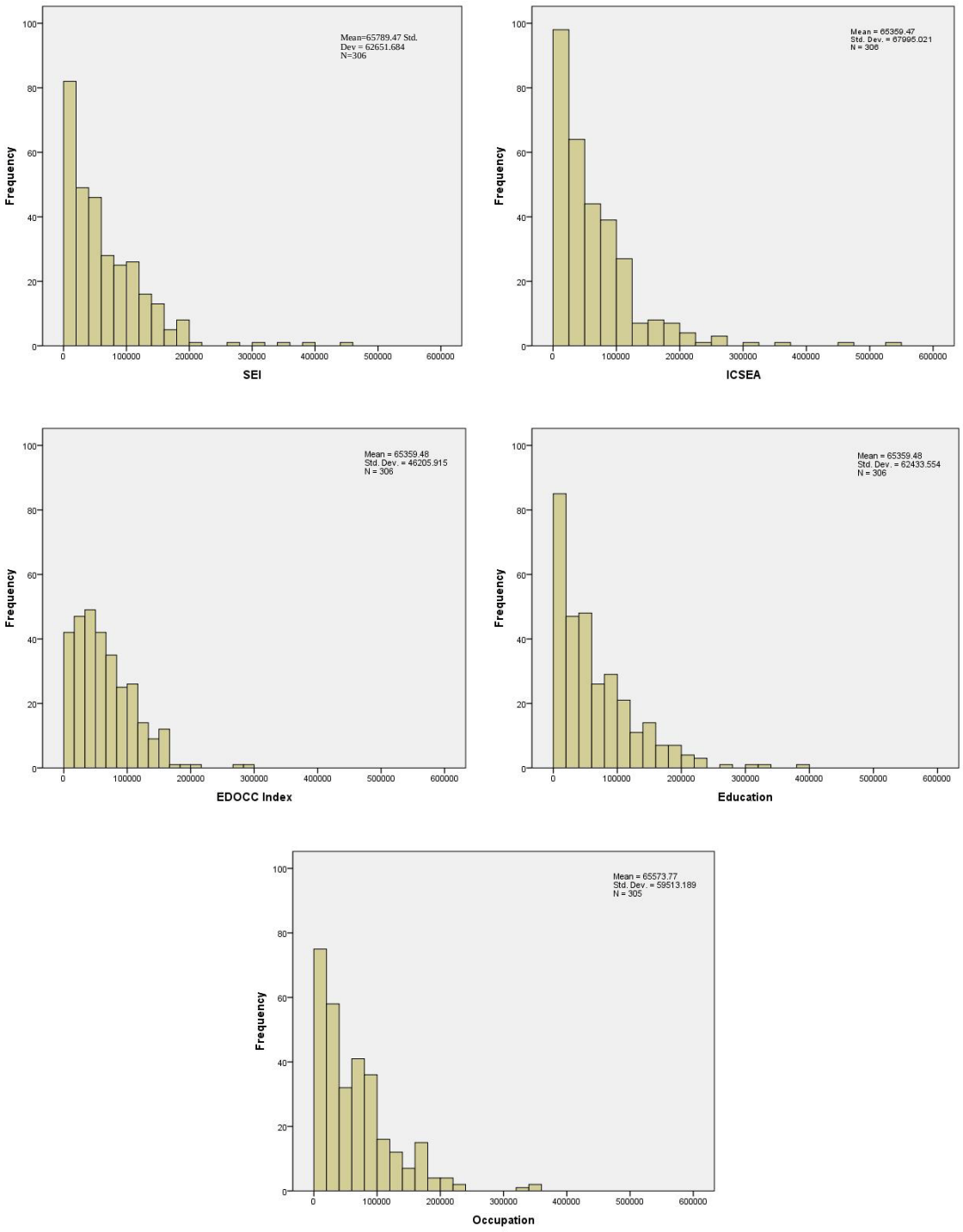
Figure 4.3 presents simulated allocations of $20 million equity funding to primary, senior high and district high schools using each of the different scales. Funding has been allocated to the same number of schools that qualified in 2010 for staffing supplementation using SEI. The same approach has been used for each scale to determine weights, subtracting scores from the median value. The scores were then multiplied against full-time equivalent enrolments to calculate the share of funding each school would receive.

Not all of the same schools would receive funds across each of the scales. For example, 60 schools would qualify for funding using the education and occupation indexes that would not qualify for funding under SEI. Similarly, 32 schools would qualify for funding using ICSEA but not using SEI.

The patterns of allocations show a different dispersion of funds across schools. The following points are worth noting:

- Under SEI the most disadvantaged schools would receive $450,000 and 77 per cent of schools would receive less than $100,000 and 27 per cent would receive less than $20,000.
- Under ICSEA the most disadvantaged schools would receive $542,000 and 81 per cent of schools would receive less than $100,000 and 25 per cent would receive less than $20,000.
- Under EDOCC the most disadvantaged schools would receive $358,000 and 78 per cent of schools would receive less than $100,000 and 17 per cent would receive less than $20,000.
- Under Education the most disadvantaged schools would receive $387,000 and 77 per cent of schools would receive less than $100,000 and 18 per cent would receive less than $20,000.
- Under Occupation the most disadvantaged schools would receive $355,000 and 79 per cent of schools would receive less than $100,000 and 25 per cent would receive less than $20,000.

Figure 4.3 Simulated allocation of equity funding allocations of $20 million, by index ($)



- The most disadvantaged school is the same according to ICSEA and SEI and would receive $542,000 or $450,000 accordingly. Under all of the education and occupation indexes this school is slightly above middle ranking and would have received about $120,000 on average.

- The most disadvantaged school on the education and occupation indexes was the same and would have received a similar amount using SEI ($300,000), but less on ICSEA ($240,000).

- 60 schools would not have been funded under SEI, but funded under the education and occupation indexes, with funds averaging $50,000 and 2 schools would have received nearly $200,000 each.

- 32 schools not funded under SEI would have been under ICSEA, with funds averaging $20,000.

Targeting of funds

The simulation takes no account of current or future priorities. Decisions need to be made about how equity funding is to be targeted and what is to be targeted. Currently, the SEI and ICSEA are composite measures which include weights for school location (remoteness) and for indigenous students, but also other elements. There are big equity issues associated with schools serving large numbers of Indigenous students, as well as for those serving large numbers of transient or mobile students and those in remote and other non-metropolitan locations. The issue is whether these schools are best supported through SEI funding in addition to population-specific targeted funding, or more directly funded to address their specific needs. Under the current index and funding formulas, there are a number of schools (9 in 2009) which have close to, or more, than 20 per cent of indigenous students in their intake, but do not receive supplementary support through SEI in staffing. Similarly, there are schools with high concentrations of students with poorly educated parents and many unemployed or in low skill work that are not receiving any support through SEI-linked funding. These outcomes are products of the use of an omnibus scale. Data on student outcomes suggest that this is not necessarily the best approach to targeting support to specific groups of students with high levels of need.

If the SEI scale is meant to target socio-economic disadvantage, and funding for indigenous students and for schools in rural and remote locations can be targeted more directly based on actual location and numbers of indigenous students, then it may be more appropriate for the index to be constructed on the more traditional SES measures of education and occupation. This would make use of direct individual student data that is already collected and currently available and use dimensions that have been shown

through a long tradition of educational and social research to be important elements of socio-economic advantage and disadvantage affecting school performance.

This is predicated, of course, on provision of separate and direct funding being applied to schools with indigenous students and schools in rural and remote locations.

Impact of SEI funding

An important question to consider is the impact of SEI-linked funding and its success in addressing need. Is the SEI-linked funding support working successfully to address the additional needs associated with social disadvantage?

Equity funding is used effectively by some schools to improve student outcomes

One way to examine this issue is to look at how effective schools receiving additional resources use their funds. Some schools with large numbers of disadvantaged students are high performing schools doing much better than we could predict given their student characteristics. They have used the additional resources they are provided to good effect. One such senior high school, for example, with reading, writing and spelling NAPLAN scores at least 15 points above the state average, uses its SSPRA funds to employ a literacy specialist, and has in place an advisory program with mentoring for at-risk students in Years 9 and 10. It also offers learning support for students and an off-site engagement program for students in Years 11 and 12.

Another school with almost 20 per cent of indigenous students and an SEI close to 90 was just under the NAPLAN state average in Year 9 numeracy in 2010 and pointed to its use of additional teachers in Years 8 and 9 to create smaller classes, a heavy focus on classroom management strategies (through PD) and intensive work with other schools:

> "We try to keep our class sizes in Years 8 and 9 to less than 28 and try to maintain classes of 25 in Years 11 and 12. There is no correlation between teachers' years of experience and the classes they end up teaching in terms of year levels. There is a rotation, and it is also about capacity building, especially with subjects like maths and English – where the complexity of the curriculum increases with year level. Whether the kids are ATAR or non-ATAR kids is considered. But the understanding is that whilst you need the best teachers in front of the kids, you also need to balance this with teachers who haven't had the experience needing to get that experience. We run a range of engagement programs and specialist programs in drama, sport, access, school volunteer reading and aspirational mentoring".

The evidence from these schools is that if it is used well, equity funding can deliver results.

Student needs associated with disadvantage remain a big obstacle

Ideally we should estimate the impact of additional resources on student achievement to determine if they "make a difference" using appropriate statistical procedures. The key issue in looking at the relationship between equity funding and effectiveness is whether, having controlled for disadvantage, the additional expenditure has improved school performance for schools with higher concentrations of disadvantaged students. One of the issues with looking at the impact of equity funding on effectiveness is the problem of multicollinearity. Where two or more predictor variables in a multiple regression or partial correlation are highly correlated with each other, problems can arise in estimating relationships between each predictor and the dependent variable. In this case, the increase in confidence intervals would work against finding a significant association between spending and outcome, having controlled for need or disadvantage. Nevertheless, it is worth considering whether the findings remain if the issue of multicollinearity can be addressed statistically. One method of dealing with multicollinearity is to regress the dependent variable onto the predictor variable (in this case, the SEI equity measure) and save the residuals. Then one regresses the residuals onto the predictor variable of interest (in this case, spending per student) to see if there is any significant effect.

It was possible to run a series of such models using several of the school performance measures NAPLAN achievement at Year 5 in primary schools and Year 9 results in senior high schools, and attendance rates. The resource variables used in the analyses included:

- Number of full-time equivalent teachers measured as student-staff ratio
- Number of support staff measured as student-staff ratio
- Salaries of teachers per capita
- Salaries of support staff per capita
- School grant funds per capita
- Locally-raised funds per capita

Two sets of models were run with the first including all schools and the second including only schools with a value of less than 100 on the SEI scale.

The results for NAPLAN achievement and attendance showed no effects for the resource variables when all schools were included. When modeling results only for the SEI-funded schools in the staffing formula (SEI value less than 100), there was no significant effects for NAPLAN achievement. There was a small significant result (beta=.369, $p<.05$) for teacher-student ratio, suggesting that low SEI schools which had a higher ratio of teachers to students achieved better attendance rates, all else equal, than other low-SEI schools.

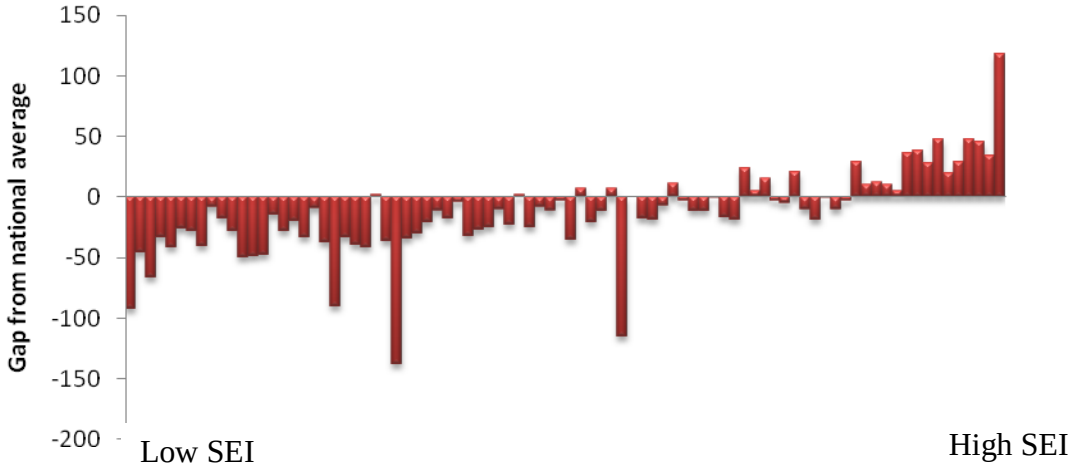
With high correlations between school performance and SEI, a test of the independent impact of resources on achievement may not be the best approach to assessing resources. Possibly a more productive approach to considering the impact of additional funding is to ask, 'what is the magnitude of the gaps in performance which additional resources are meant to tackle?' The upper panel of Figure 4.4 presents 2010 NAPLAN Year 5 mean achievement for metropolitan primary schools with more than 100 students. The scores are the gaps between school mean achievement and the national average for government primary schools. The schools are rank ordered from lowest to highest SEI. The lower panel of Figure 4.4 presents the corresponding information for Year 9 achievement in senior high schools. In both charts, 0 represents the national average. The national average for government primary schools was 479. The national average for government secondary schools was 559.

The concentration of low SEI schools with poor results raises the question of whether the level of additional resources and support given to these schools is big enough to improve performance, whether the resources available are spread too thinly at present to respond more effectively to the challenge of under-achievement in these settings, or whether the resources that are provided are not being used effectively enough by the schools. Case management, individual attention, special programs, and specialist support all require a level of resources which enable teachers to be released from their classrooms. It is the funding model which seeks to release teachers from their classrooms or to multiply the number of classes through strategic reductions in class numbers, or to employ additional support staff. Resource levels may be adequate to do this, but the performance of the schools suggests that it is not having the desired impact.

Figure 4.4 Distance from national mean in NAPLAN Reading achievement, by SEI: senior high schools and metropolitan primary schools with 100 or more students

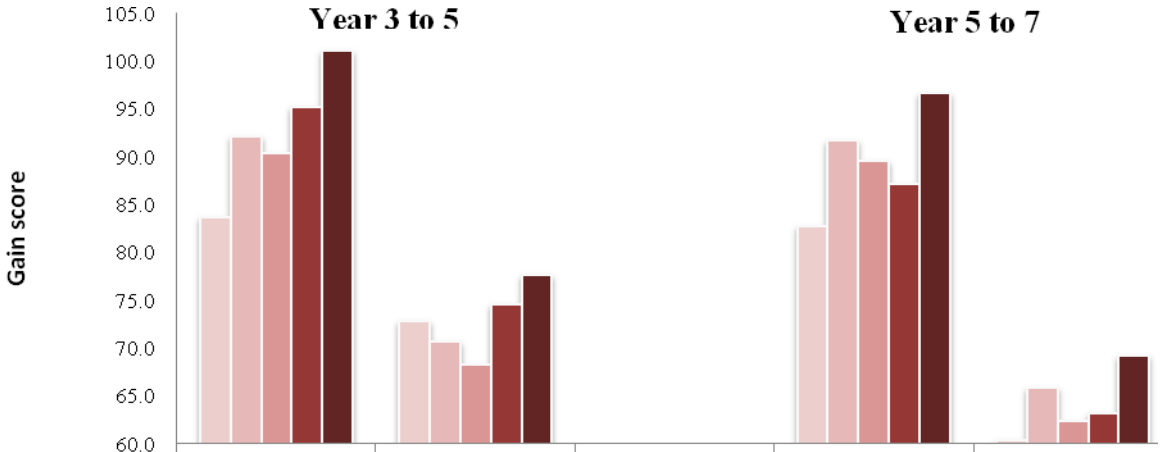
Year 5 Reading: metropolitan primary schools

Year 9 Reading: senior high schools



There is a more troubling result. Figure 4.5 presents the mean NAPLAN gain scores in numeracy and writing in primary schools. Gain scores have been derived by matching students across year-levels from 2008 to 2010 and estimating individual growth in skills. Average growth is then calculated for students remaining in the same school. Schools have been grouped into quintiles based on their SEI values.

Figure 4.5 Average NAPLAN gain scores in numeracy and writing, by SEI quintile, 2008 to 2010, primary schools



	Numeracy	Writing		Numeracy	Writing
Low	83.6	72.8		82.7	60.4
Lower middle	92.1	70.7		91.7	65.8
Middle	90.3	68.3		89.5	62.4
Upper Middle	95.1	74.5		87.1	63.2
High	101.0	77.7		96.7	69.2

The mean gain scores from Year 3 to Year 5 in numeracy rise across SEI quintiles. Students in low-SEI schools (the lowest quintile) have made lower average gains than students in high-SEI schools (the highest quintile). The average growth in low-SEI schools was measured at 83.6 points compared to 101 in high-SEI schools. Therefore, not only do students in low-SEI schools start well behind students in high-SEI schools (in 2008 the average Year 3 numeracy score in low-SEI schools was 72 points below that for high-SEI schools) the students fall further behind as they progress in school. The numeracy growth from Year 5 to Year 7 shows that this pattern is maintained. Students in the most disadvantaged schools start behind others and fall further behind as they ascend school and the funding strategy is not working to prevent this.

One of the features of the schools in the lowest quintile of SEI is that they have high concentrations of indigenous students 35.3 per cent on average compared to a mere 1.4 per cent for schools in the highest quintile of SEI. The differences in numeracy skill growth suggest that current funding arrangements are not working to overcome their disadvantage. For this group, however, the issues from a social and educational point of view are enormous and it is unlikely that that can be addressed adequately through the SEI (?) A different sort of approach is needed within the school system to support the education of indigenous students. To do this, it is best that resources are directly targeted

and not through the device of the composite SEI scale. This would give schools and the system greater transparency around what is being targeted, in order to directly deal with the immense challenge of addressing the educational needs of indigenous students.

If the goal of SEI-linked funding is to neutralize the effects of SES on student achievement gaps then the results in Figures 4.4 and 4.5 suggest that is not yet happening well enough. While achievement gaps across schools may be much wider if not for SEI funding, gaps remain and for schools at the lower end of the SEI scale the gaps are large.

Where children come to school poorly prepared in terms of reading and listening skills, capacity to concentrate, social skills, and cultural knowledge, schools have a big challenge. But resources alone, without consideration of the programs and interventions that can effectively address need, may undermine impact and not represent the best approach to supporting schools.

Conclusion

Equity funding is one of the most critical issues in designing a new school funding model aimed at improving school effectiveness. The schools which experience the highest levels of scholastic failure, the lowest rates of school retention and the poorest attendance rates are those with the highest concentrations of disadvantaged students. The gaps between these schools and the rest are large on all of the effectiveness indicators. If resources are to be allocated in ways to target improvements in school performance then a more strategic approach will be required, as well as consideration of the levels of resources. Schools that have high concentrations of indigenous students need targeted funding with support to identify effective strategies. This is best met through direct funding tied to indigenous enrolments, and with consideration given to the funds needed to implement effective strategies of access, well-being support, relevant and effective pedagogy and pathways planning. Only then will it be possible for these schools to meet the expected standards of learning and drive improvements.

The direct targeting of resources for indigenous students would allow SEI-linked funding targeted through a new SEI measure to address the socio-economic disadvantage that affects the performance of many schools. This will involve a significantly more targeted commitment on the part of government to raising achievement levels and reducing major gaps in achievement. Such a commitment needs to be matched, from the schools that benefit from additional resources, with a commitment to pursue effective strategies. This implies a stronger accountability framework in which schools more clearly identify how

the additional resources are used. One way of doing this is through a "performance agreement" between the school and the Department. Such an agreement would articulate expectations for improvement, including monitoring and evaluation processes, while also setting out the Government's undertaking to guarantee resources and service delivery support.

5. A new model of school funding

Taking stock

There is wide recognition internationally that early and sustained intervention is necessary to give students the best chance of success and to ensure that all make good progress. In some school systems, this has led to relatively high resourcing in the early years of primary school and provision of high-quality pre-school. In other systems, there is an emphasis on the middle years spanning upper primary and lower secondary. These approaches are informed by the same broad concern to build strong platforms of achievement at successive stages of schooling. By doing so, a depth of foundation is laid which will enable young people to take advantage of many different study options in upper secondary school, in higher education and in the VET sector.

Highly effective schools in Western Australia recognize the need to apply teaching resources strategically with a view to building the platform of cognitive and social skills that will sustain students in their journeys through school and beyond. The most effective primary schools concentrate resources in the early years and operate staffing ratios across Years 4 to 7 which do not advantage any year-level. High-performing secondary schools also make a more even use of teaching resources across year-levels. Their strategy is to build early and maintain the effort. Poorly performing secondary schools, by contrast, operate staff ratios in Year 12 which are almost double those in Year 9. The best schools are found to work *against* the pattern of resource allocation based on year-level multipliers. This is one of the clearest signs that the current funding model is hampering rather than facilitating good educational leadership in schools.

Many principals recognize that the funding model is ill-adapted to the challenges they face. It works against flexibility, lacks transparency, and is too complex. Although there is a range of opinion about desirable directions of change, there is also an important degree of convergence. Primary school principals are, as a group, very clear about the way forward. Heavy investment in the early years is essential, but additional support is needed in the upper primary years, which currently receive the least support of any stage of schooling. Many primary school principals also want to see additional effort extended into the lower secondary years. They know that there are major issues of readiness and transition which must be addressed on *both sides of the primary-secondary divide*. Equally there are many senior high school principals who want to see both a bigger effort

in the lower secondary years laying the foundation and also a bigger effort in the upper primary years again preparing the way.

It is not accidental that this more strategic and inclusive view of need comes from senior high school principals whose schools serve poorer communities. This is the group of principals who are most aware of under-achievement amongst students enrolling in their schools and the great diversity that these students present. These principals rely more heavily than others on the effectiveness of their feeder primaries, located in the same disadvantaged areas. Their own schools have little resource flexibility and relatively little in the way of locally-raised funds. They need the feeder primary schools to work very well if they, in their turn, are to add value and draw out the best in the students coming to them.

This convergence of view on the importance of the middle years is backed up by many indicators of student achievement and student engagement. It is during the middle years that attachment to school weakens, interest falls away along with academic self-esteem, achievement gaps widen, attendance declines, and there are mounting behavioural issues. This occurs just at the time when the cognitive demands of the curriculum are increasing: schoolwork becomes more complex on both sides of the primary-secondary divide.

What principals see in the middle years is a point of fundamental importance in the design of a school resourcing model. The declining resource allocation that occurs in these years in which there are growing tensions on a range of fronts highlights the need for an intensive effort at *all* year-levels and the importance of not allowing that effort to falter at *any* stage of schooling. The middle years are not more critical or of greater "strategic" significance than any other phase of schooling. They become more critical because of the reduction in resourcing that currently takes place. For example, the change in maximum class sizes in Western Australia represents a shift from about the average Australian primary school of 23.9 students in 2006 to the average primary school in Malaysia in 2005 of 31 students (OECD 2007; Malaysia 2007).

Western Australian principals see in their students a changing world. In the funding model they see the past. They see a model which is haunted with the history of a divided school system academic-preparatory schooling for a minority (highly resourced) and mass compulsory schooling for the majority (relatively poorly resourced). It is clear current funding arrangements have reached the limits of their effectiveness.

Principals are tackling the challenges of today with instruments fashioned, not yesterday, but decades ago. Public primary and secondary schools have a wide population exposure. They enrol students from all social backgrounds, with a growing imbalance that concentrates disadvantage in the government sector. The social and emotional needs of students from all backgrounds are becoming more complex and are encountered at earlier ages than in the past. Some schools work with high levels of disadvantage, including physical and mental health issues, behaviour problems, family indifference or incapacity, drug- and alcohol related problems, and very uneven levels of school readiness and cognitive growth. Many learning and behavioural problems are unresolved in primary school and carry over into secondary school. Under-achievement accumulates, while the ability of parents to support student learning tends to weaken as more complex academic work is introduced. As we have noted, student levels of interest and confidence falter over the middle years, and disengagement sets in. Many low achievers drop out, while those who continue face an uphill battle with the upper secondary curriculum and its focus on formal assessment and selection for higher education.

School is today more central to the lives of children and their families than in the past, but this only tends to magnify the significance of differences between them in family life-style, aspirations, educational background and economic situation. Broad social forces, including long-term changes in diet, leisure habits, physical development, family structure, workforce participation and technological change are concentrating tensions in school whose role in cultural transmission and social integration is being tested at the same time as formal accountability is rising.

What a funding model should do

A model of school funding that addresses twenty-first century issues and expectations should meet two basic requirements. It should minimize performance differences between schools, and it should maximize the progress of students during each stage of schooling and over stages of schooling.

The first requirement is one of *horizontal efficiency*. Resources have their maximum impact when the gap between schools at any given stage of schooling in terms of the proportion of students achieving national minimum standards is minimized.

The second requirement is *vertical efficiency*. Resources have their maximum impact when all students make good progress during each stage of schooling, though starting from different levels of achievement and progressing at different rates.

The greater the horizontal efficiency of a funding model, the greater its vertical efficiency. Minimizing performance differences between schools at any one stage of schooling maximizes the progress of students over subsequent stages.
The public school system of Western Australia is highly stratified in achievement terms. The resources that flow into this system have no discernible impact on performance differences associated with the out-of-school characteristics of students.

It might be argued that such differences would be even greater without the adjustments to resource levels that are made under the current staffing model and through equity programs. But in fact the relationship between performance and student characteristics could not be much stronger than it is. As we have documented in this report, the ICSEA measure of socio-economic status accounts for nearly three-quarters of the variation in Year 5 numeracy scores (Figure 2.5 in Chapter Two).

Performance differences between schools which simply reflect social differences between students do not represent an efficient use of resources. Schools aim to work in such a way that achievement differences do not reflect family background. It is the child rather than the child's background that matters. Most value is created when achievement differences are minimized and cannot be predicted from social background. This represents a highly efficient use of resources.

The funding approach in Western Australia does not deliver horizontal efficiency in the use of resources. On the contrary, it sustains large differences in the performance of schools. As a result, the performance of students through each major stage of schooling is also affected. Students from poorer families not only start from a weaker position in terms of cognitive development, but also make less progress over stages of schooling.

Across Australia, the children of university-educated parents have a reading standard (mean performance) in Year 3 which is only reached by the children of poorly-educated parents in Year 5. This gap widens progressively. In Year 7, the socially most advantaged children are reading at a level which is not attained by the socially most disadvantaged children till Year 9, and have moved still further ahead.

Under-achievement in earlier stages of schooling is carried forward and builds up in subsequent stages. This accumulation of failure does not represent an efficient use of resources. Across stages of schooling, the curriculum becomes more complex and demanding. Success at higher stages presupposes success at lower stages. Where this does not happen, teachers must compensate where they are able by multiplying attention to particular individuals, e.g., through small remedial classes or through classroom

strategies which target these individuals or through team teaching or education assistants. In effect, teachers have to repeat the work that has already proved unsuccessful, or implement new and different actions which enable a student to catch up.

Important as this redoubling of effort is, it does represent a diversion of effort from designing and teaching courses that extend and challenge students and take them to higher cognitive levels. Resources are not being used to maximum effect. Many students are consuming twice the volume of resources through "repair" actions which spread over two or more years the tasks that are usually accomplished in one. Moreover, it is not only in the classroom that costs are being doubled. Behavioural and personal issues drain the attention of teachers from academic work and consume the time of school leaders. The costs of accumulated failure are high and they compound.

Funding arrangements must make each stage of schooling count. If not, failure accumulates, costs rise and the impact of funding declines.

Moreover, at each stage of schooling, educational quality has to be uniformly high *across the public system as a whole*. Failure at any one site undermines community confidence in public education generally. As parents migrate their children to the private sector, the public schools most affected by this become more expensive to run (their unit costs rise, their equity funding increases) and less effective in student outcomes (erosion of student mix).

Funding policy has to achieve both *vertical efficiency* (minimizing the transfer of failure to successively higher stages of schooling) and *horizontal efficiency* (minimizing achievement differences across schools at any one stage of schooling).

If students under-achieve in the early years of primary school, the cost is transferred to upper primary school. If students continue to under-achieve or fall behind in the upper primary years, the cost carries over into lower secondary classes. Here learning problems will be even more difficult to repair, given organizational differences in secondary schools and a fragmented subject-based perspective on children, and if under-achievement continues, it will frustrate the efforts of teachers in specialized upper secondary classes.

Is the funding model in Western Australia fit for purpose?

For many years, government in Western Australia has sought to deliver equitable resourcing across a large and very diverse jurisdiction. Adjustments to staffing formula

and many special lines of funding have tackled problems of low performance and educational disadvantage. Many piecemeal changes have been made to a system of resource allocation which has become excessively complex and has now exhausted its capacity.

Funding arrangements do not consistently address the twin objectives of *vertical efficiency* (minimizing the number of low achievers progressing through stages of schooling) and *horizontal efficiency* (minimizing performance differences between schools). Higher resource levels for kindergarten and the early years of school do aim at both these outcomes. Early intervention *should* increase readiness for school and reduce the effects on learning of differential cognitive, linguistic and social growth associated with family background. But, as many school principals observe, this effort is not sustained through the upper primary years. Resources per student fall and class sizes rise sharply. These changes occur just at the point when schoolwork itself is becoming more complex and demanding and when there is more emphasis on students' personal responsibility for learning. As students enter the "middle years" of schooling, resource levels are lowered (both quantity as measured by teacher FTE and quality as measured by experience). This contributes to *vertical inefficiency* (accumulation of under-achievement and relaying this upwards).

Equity policy aims at *horizontal efficiency* (minimizing between-school differences) and through this at vertical efficiency (maximum readiness for each subsequent stage of schooling). But the evidence of persistent gaps confirms the observation that resource differences based on SEI are relatively small, inconsistent, and inadequately concentrated and targeted.

While the resource model in Western Australia invests relatively heavily in the early years of primary school, it does not do the same for the early years of *secondary school*. On the contrary, the resource effort increases at *higher* year-levels and peaks at the year-levels *where the capacity to influence outcomes is weakest*. In Years 11 and 12, teachers in schools serving poorer communities are confronted by a large gap up to two years relative to achievement norms in schools located in socially more advantaged settings. Weaknesses in basic learning divert the efforts of teachers, who also face significant attitudinal and behavioural issues (e.g., low attendance, lack of interest). The emphasis turns to remediation and vocational training. The failure to achieve vertical efficiency creates more horizontal inefficiency as displayed in wide variations in school completion rates and in academic results.

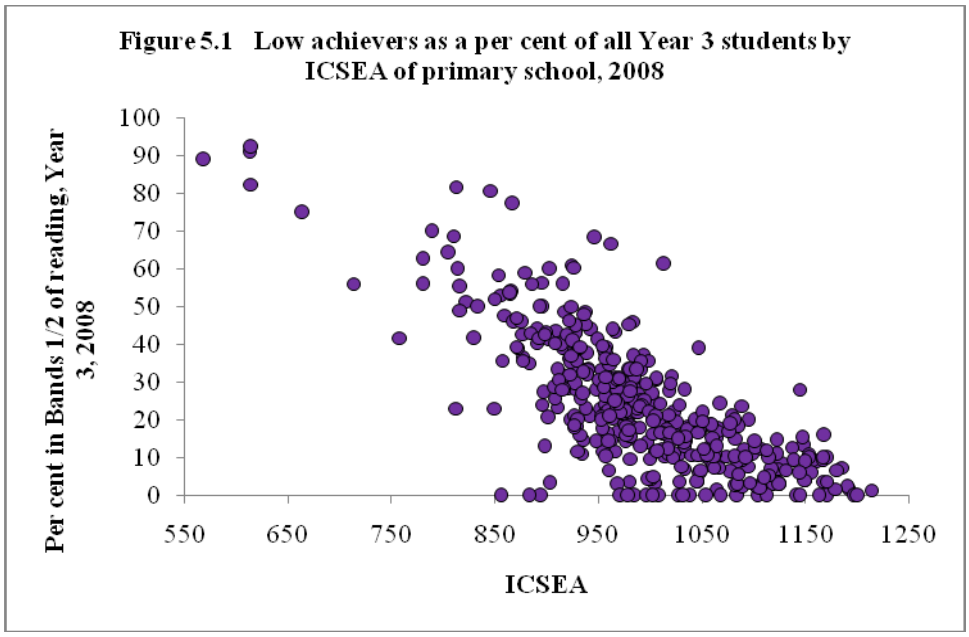
Weaknesses in the performance of schools lead to declining enrolments and mounting cost inefficiencies. Small urban high schools battle with falling rolls, while clinging on to academic programs in the senior years. They cannot deliver these efficiently, but must offer them if their students are to have at least some opportunity of academic success. Equity funding helps, but does not address the root cause too little intervention, too late. Where these schools most need resources at lower year-levels the funding model provides the opposite. It compensates them for running small classes at the top end of school, but fails to create the conditions in which under-achievement could be effectively tackled before it is too late.

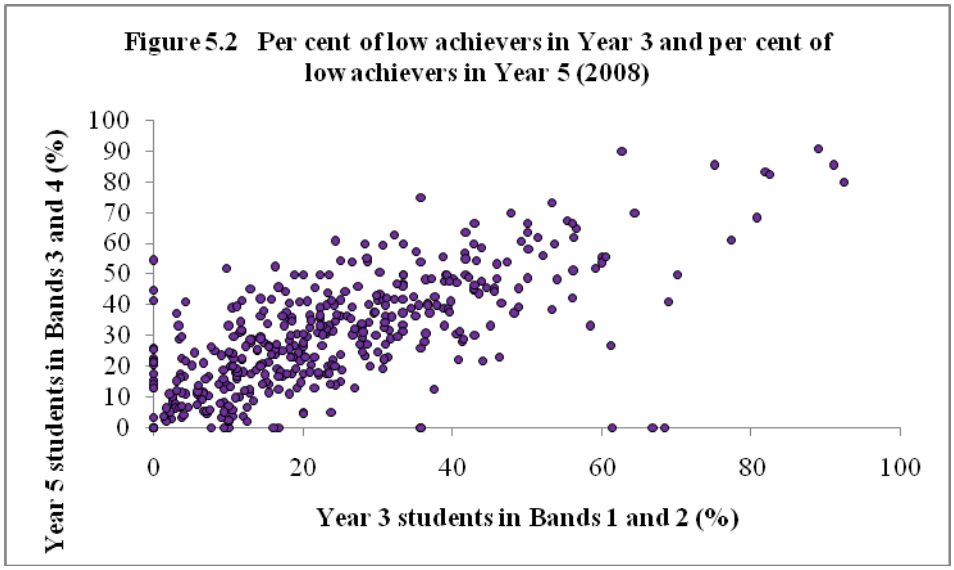
By contrast, the schools that serve socially advantaged communities are able to achieve and sustain vertical efficiency, and this translates to full rolls and full classes, including in the senior years (which profit from higher year-level multipliers).

Gaps between schools in Year 3 and relaying these gaps to Year 5

The failure of funding arrangements to minimize performance differences between schools at any given level of schooling (horizontal inefficiency) is highlighted in Figure 5.1. This chart compares the percentages of low achievers in Year 3 to a school's ICSEA measure. Low achievers are defined broadly as students at or below national minimum standards in reading. About half of the variation in the percentage of low achievers is related to the SES of the school (r = -0.777).

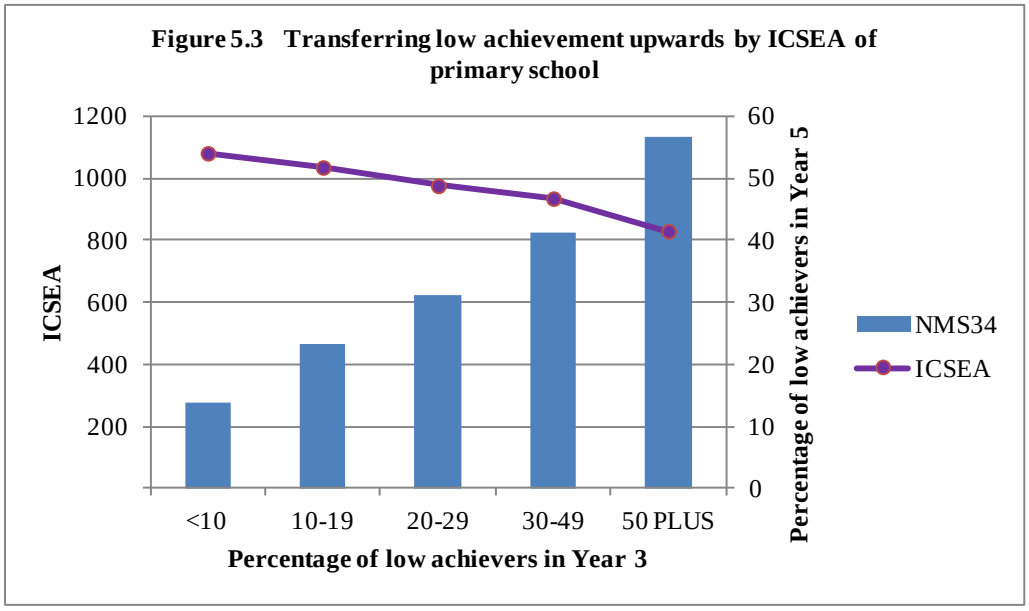
This very strong relationship lays the foundation for a flow of low achievers from Year 3 to Year 5. If a school has many low achievers in Year 3, it is likely also to have many low achievers in Year 5. This is shown in Figure 5.2, which compares the percentages of low achievers in Year 3 (horizontal axis) to the percentages in Year 5 (vertical axis). Note that these are two different cohorts Year 3 (2008) and Year 5 (2008).





There is a strong chance that a school which has proportionately many poor readers in Year 3 will also have proportionately many poor readers in Year 5 (r=0.703). If a school struggles to lift achievement levels in Year 3, the difficulties experienced by students will migrate upwards, as Figure 5.2 shows.

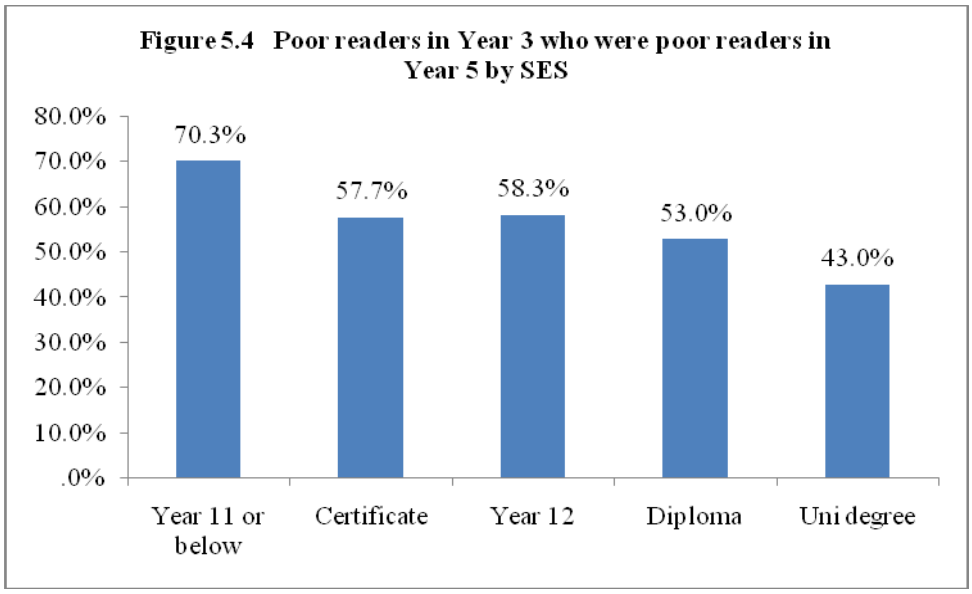
The schools that do struggle in Year 3 tend to serve low SES and indigenous communities. This is shown in Figure 5.3. Schools that have proportionately many poor readers tend to be low SES and they also tend to have many poor readers at higher year-levels.



The performance of public schools as a system exhibits a social inertia a tendency to repeatedly re-create a social pattern in student achievement, and thus to weigh down the overall performance level of the system. This is strikingly illustrated by NAPLAN data for Western Australian public primary schools showing "relayed failure". This refers to the tendency for under-achievement to carry over from one year-level to the next without abating. A measure of the extent to which low achievement "carries over" from one year-level to a higher year-level is given by the proportion of students who are low achievers in Year 3 and who, after two years of grade progression, are also low achievers relative to Year 5 standards.

We define "low achievers" as students whose reading score in Year 3 places them at one standard deviation below the mean. We can expect many students to improve their relative position over subsequent years and they do. But many do not. A major issue is who improves and who does not, and whether this is socially random. For the purpose of this analysis, SES is measured by parents' education. We should note that, for Western Australia, information on education is not available for a sizeable minority of parents. The analysis which follows is thus indicative only. However, we expect on the basis of other analyses presented in this report that similar results would result from using SEI or ICSEA.

Figure 5.4 shows that for every 100 Year 3 low achievers whose parents are university-educated, 43 are also low achievers in Year 5. The majority have thus improved, though a large minority have not.

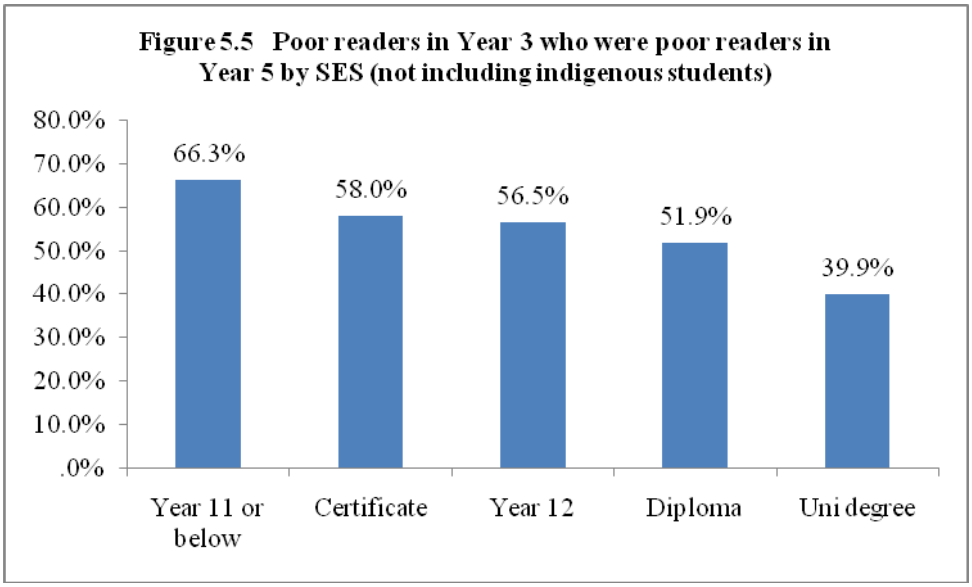


Descending the scale of socio-economic status, the proportion of students who are also low achievers in Year 5 tends to rise. Instead of 43%, the figure rises from 53% to 58% in the middle bands of SES, and to as high as 70% amongst students in the lowest SES band.

In effect, the least progress is made by the children who depend most on school to reverse the effects of out-of-school disadvantage.

The majority of these children carry a burden of under-achievement from one year-level to the next, which school does not lighten.

Part of the pattern of "relayed failure" in Western Australia reflects the weaker outcomes recorded by indigenous students. To highlight this, Figure 5.5 analyses progression for *non-indigenous students only*. The extent of "relayed failure" falls noticeably at each status extreme.



This shows that the weaker outcomes for indigenous students make a difference to the overall social pattern, though not for every band of SES and not greatly. The SES pattern is not due primarily to poorer achievement amongst indigenous students, though this does add to the pattern.

One of the challenges for a funding model is to reduce the extent to which under-achievement is relayed up through higher and higher year-levels. Figures 5.4 and 5.5 show that even for students from the socially most advantaged families there is a large minority who are not catching up. The problem of relayed failure is not only an equity problem, and it requires more than an equity solution. For even the groups of students who depend *least* on the performance of schools fail to make up ground in significant numbers. School has to work better for them as well as working very much better for students from poorly-educated homes.

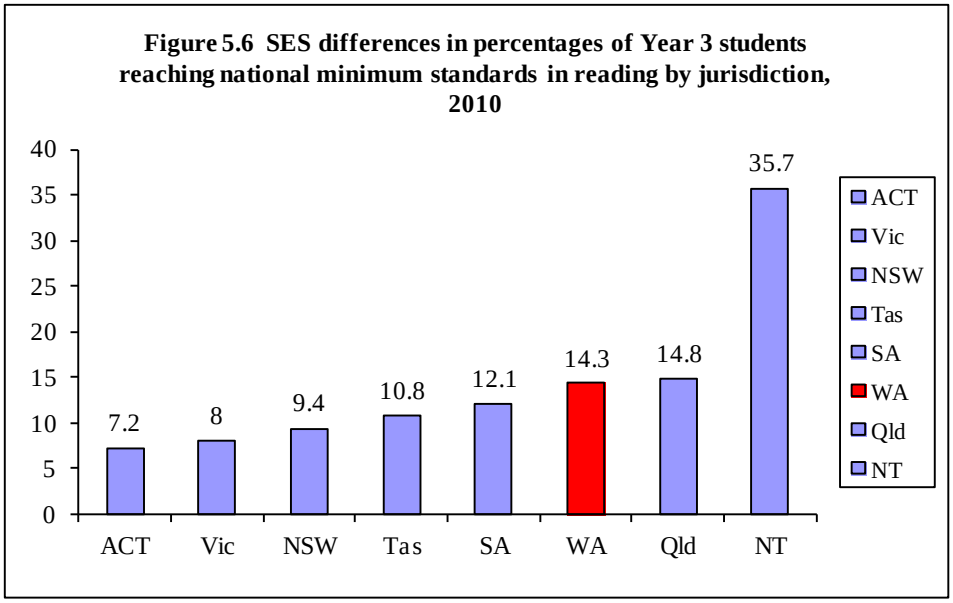
If we are to minimize performance differences between schools and maximize the readiness of students for more demanding and enriching schoolwork, we must begin with the recognition that each stage of schooling is important in its own right. No doubt the developmental needs of children and adolescents impart a distinct complexion to the early years of primary school as compared, for example, to the early years of secondary school. But a child's needs are no less important at one stage as compared to another. Doubtless, too, the cognitive demands that define the curriculum intensify as children advance into higher and higher classes. But teachers are trained to deliver these demands and to support children's progress, whatever the level of the curriculum and regardless of its complexity. Teachers certainly encounter a higher level of resistance from students in

the early to middle years of secondary school than in early primary school. But very young children also make themselves inaccessible and can be just as refractory to learning as adolescents. They present less of a threat, but teachers need no less support to deal with a silent child in Pre-primary than a rowdy adolescent in Year 9.

Each stage of schooling requires an intensity of effort if the maximum number of students is to be ready for the next stage. It is the effort to ensure that every child counts equally in teaching terms that makes every stage of schooling count equally in resource terms. Under current arrangements in Western Australia, a Year 10 class can be as large as a Year 4 class, but more teachers are made available to Year 10 students than Year 4s. Not only is it possible to staff Year 10 classes more generously, but each member of staff has a more generous allocation of time for duties other than teaching (DOTT). This might be considered justifiable, at least in secondary schools receiving high proportions of low achievers. But funding arrangements should be designed to *prevent* large numbers of students falling behind and being unable to cope with the work in Year 10.

To reduce the "failure relay" from one year-level to the next requires a much more balanced approach to staffing across primary and secondary schools. This is to ensure that students have equitable access to teachers. Students also need access to a broad range of curriculum at all educational levels, not only in secondary school through middle-school electives and upper secondary options.

In 2010, the school system of Western Australia had one of the largest socio-economic gaps in children's reading competence in the country (COAG Reform Council 2010). Figure 5.6 shows that the gap was greater than in almost all other jurisdictions.



Much of the task of reducing this gap falls to public schools. The funding model which delivers resources to them should be designed to minimize differences in performance between schools and maximize the readiness of children for more demanding schoolwork. These two goals represent the most effective and efficient use of scarce public dollars.

Principles of funding

The aim of this review was to look at how schools use their resources in order to develop options for a new school funding model. This focus shows a commitment to development of a new budget model that can ensure all students attending public schools in Western Australia have access to a level of resources which enables them to achieve a high standard of learning and to promote quality student outcomes that equip young people with the skills needed for effective participation in education, work and community.

Current input approaches to school funding focus on the different stages in the "production" of education and the raw cost of what is required to establish and deliver each stage. This represents a focus on equity in inputs labour, materials, capital in their dollar or raw unit forms. That is, the ideal is to have these inputs distributed equitably, which is not necessarily equally. Attention needs to turn to outputs (e.g., what schools produce, such as types of achievement) and outcomes (e.g., career paths) that are variously related to what schools do.

A new funding model, therefore, needs to take on an outcomes focus and should be designed and used to promote performance. This involves an important shift in perspective from providing inputs according to a staffing formula to looking at the resources needed to have good outcomes. And this in turn implies adjusting resource levels to what it costs to achieve good outcomes for different student groups. While public schools in Western Australia work well, they also work under very different conditions and enrol students from a wide range of backgrounds, depending on location. A resource allocation mechanism needs to ensure that funding levels match equity challenges, so that no student is disadvantaged.

Different students have different educational needs, and funding levels should reflect those needs as best as possible. To promote high quality outcomes for all requires an appropriate mechanism of needs-based funding. The formula arrangements therefore need to be responsive to context. This means that they must be capable of reflecting differences in the circumstances of individual schools and in their student population and community.

A resource allocation model should provide schools with the level of funding necessary to achieve effective outcomes for all student groups, taking into account equity and developmental needs, and recognizing that not all families and communities have an equal capacity to raise funds to support the teaching effort in their schools. Effectiveness and fairness must be the central tenets in a new funding model.

In developing a new model, the arrangements also need to promote predictability and quality. Allocations to schools should fund students fairly and adequately, while preserving stability at all schools. Communities and their schools change over time, and the requirements on schools also evolve. A funding model must be responsive to these changes to ensure that resources are delivered to where they are most needed.

Key goals of a new funding model should also be to provide schools with flexibility in planning and resource deployment. School leaders are best positioned to decide how to improve achievement in their school and the budgets should be designed to promote this. As one IPS principal put it in the statewide online survey, “Schools are best placed to make decisions on how to use their resources.” The aim of increased school based-management is to give schools greater authority, responsibility and accountability over finances and the allocation of resources. Increasing decision-making capabilities at the local level aims to allow administrators to better address the needs of individual students and respond to local context and circumstances. The Independent Public Schools

initiative, in the words of another school principal, “allows the school to make local decisions that best meet the needs of students.”

Under current arrangements, in addition to staffing allocations, funding includes monies for some maintenance of school buildings and grounds, for aspects of human resource management, and support for materials associated with teaching programs, special programs and extra-curricular activities. Salaries are the largest component of the education budget, and currently for non-Independent Public Schools, staff recruitment and allocation are centralized, so that in practice schools have only partial flexibility in controlling these resources.

Greater flexibility in resource planning and deployment at the school level also requires greater accountability so that there can be community confidence in the way public resources are used.

Any model of resource allocation also needs to be transparent so that calculated assessments and allocations are clear and evident to schools and the community.

Student centred funding model: simpler and fairer school funding

The model that is proposed gives schools control of financial management, including responsibility for human resources (such as recruitment and management of teaching and non-teaching staff), for core teaching programs, special programs and extra-curricular activities, and for maintaining buildings and grounds. This would be achieved by estimating the costs of delivering effective and efficient school services and using the estimations to allocate core funding on a per capita basis adjusted for school characteristics and with per capita supplements for equity components.

The model gives schools maximum flexibility and autonomy by giving them control over all of the main financial elements of school budgets, including teacher salaries. The Department would no longer be responsible for allocating teachers, and teacher salaries would need to be considered by schools in their financial planning. The Department would still be responsible for payment of teachers through central payroll services, but salaries are included in the operation and management of budgets. This would mean that the costs of teacher salaries need to be factored into the planning and operation of individual school budgets and staffing no longer treated as an allocation based on a staffing formula.

A student centred funding model comprises core funding through a per-student price and a base school allocation, where required. The vast majority of funding would be provided by the per-student price, with the base school allocation only to cover "minimum overheads". Accompanying this requirement is the need to ensure that the combination of the base school allocation and per-student price provides schools with sufficient funds to deliver full services.

It is envisaged that in larger schools, economies of scale would dictate that funds provided via the per-student price will be sufficient, and that no base school allocation will be required. Conversely, it is presumed that diseconomies of scale are present in smaller schools, creating the need for a base school allocation. Accordingly, the following principles would guide the establishment of the base school allocation and per-student price:

- maximise the amount of funding provided to schools through the per-student price, while minimising the size of the base school allocation

- minimise individual school funding changes through the combination of the per-student price and base school allocation

- ensure schools have adequate funds through the combination of the per-student price and base school allocation to function.

Specific purpose program payments and the school grant which currently operate as separate funding lines, would be consolidated through the core price per student, or where appropriate, as equity funding.

This would ensure schools are given appropriate levels of resources to operate the programs, but flexibility in the deployment of resources.

In summary

1. Core funding is delivered through a uniform price per student.
2. A separate base allocation is made to schools to cover minimum running costs. The base is enrolment-tapered.
3. Geographical isolation and small size constraints are addressed through separate and specific additional lines of funding.

4. Socio-economic disadvantage is tackled through an allocation based on density or relative concentration of students from low SES backgrounds, derived from information relating to individual students, not area characteristics. Education and occupation of parents are the relevant characteristics, and a suitable scale is constructed from these characteristics. Composite and area-based measures are not used.
5. Indigenous funding is consolidated into a single targeted line.
6. Disability, ESL and refugee funding is delivered through three separate lines, each involving clinically or pedagogically-assessed need. For each group, individual assessments are required, and support is scaled accordingly.

The model that we have outlined in broad terms reflects the practice of the most effective schools in the state and accords with international best practice. It represents a major shift in thinking with two clear objectives minimize performance differences between schools and maximize the progress of students.

The model makes no distinction between levels of schooling, only between students. It shifts the issue of the relative *quantity* of resources that are delivered to students at a given year-level *by a staffing formula* to the issue of the *quality of the teacher* responsible for those students as *decided by the school*.

The model recognizes the constraints under which schools operate rurality, isolation, density of disadvantage and loads up resources to compensate for these.

Simplicity and transparency are major features of the model as is flexibility for schools in deciding how resources are allocated to students.

Moving to a new model

To work well, a student centred funding model should be supported by other changes, including:

- fully devolved financial, decision-making and accountability structures
- schools having capacity for autonomous control of staff recruitment
- financial management skills in schools being of even and high quality
- mechanisms for ensuring that quality and equity targets are met

- processes in place for monitoring expenditure in relation to improvement, and
- rolling benchmarks established at intervals to assess targeting and changes in cost.

All schools must operate sound financial management practices that support the financial objectives of:

- establishing proper financial management arrangements and accounting procedures,
- maintaining a reliable system of internal controls,
- ensuring that funds are used for the purpose intended,
- fulfilling the requirements of public finance accountability.

Moving to this new approach will require a phased process to enable schools to adjust to an environment in which they have new responsibilities, but also greater freedom of action. It will be important to ensure that principals are well-prepared and supported to manage the transition and to take full advantage of the flexibilities delivered by the new model. In the long run, the adjustments relate to the capacity to choose staff to match students this is the single biggest complaint levelled by principals against the current funding arrangements and on the other hand to manage the budget to employ the most suitable staff. Principals accept the need for change, but they also need time to adjust.

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