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ORGANISATION OF LEARNING

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EDITORIAL

Re-organising Learning

JOHN GRAHAM

THE THEME OF this edition of *Professional Voice* is educational change and its impact on the organisation of learning. While the focus is primarily upon schools, some of our authors link changes in schooling to changes in other areas of organised learning such as teacher education, pre-schools and community-based learning.

Traditional forms of learning organisation are under pressure on all fronts. Rapid social and economic changes are buffeting governments, school systems and individual schools, and raising questions about the quality of education on offer. National and international testing league ladders grab front page headlines and can send political shockwaves through governments and bureaucracies no matter how well students are performing. There are rising expectations and rising levels of criticism about educational "outcomes".

The official reaction is to pump out a continuous flow of "improvement" initiatives. E Abrahamson (2004) has referred to this response as "repetitive change syndrome" while Andy Hargreaves (2007) calls it "initiativitis" and believes it is inimical to the slower, more sustained development that will bring about real change.

The goal of education authorities in launching their reforms is understandable. They wish to identify and modify those components of the system which count in terms of improving student performance. Many of the components identified in this

way fall under the general heading of learning organisation. The incentive is there to implement reforms covering everything from the grouping and location of students to the structure of the curriculum, the use of time and the relationships between institutions. The constraint is always the same — the level of funding that governments are willing to provide to support their improvement goals. The reluctance to substantially reduce class sizes is a good example of cost factors determining policy.

Changes to learning organisation underpin many of the reform initiatives in Victoria. Some of these initiatives are small scale pilot-style developments involving a few schools, while others are system-wide mandates. They reflect the institutionalised nature of schooling and are often seen as ways of redressing its perceived drawbacks. For example, some large schools are being broken into smaller administrative units to improve social and learning relationships and provide more coherence in the school experience of students. "Looping" (a good American term), where students stay with the same teacher for several years, is another approach being trialled in a number of schools.

VELS is an example of a system-wide mandated reform which restructures the curriculum and fosters the integration of learning areas. The new possibilities of curriculum organisation encouraged by VELS have been realised in some schools through changes to the organisation of learning/teaching time and to the organisation of students. These initiatives are designed to improve the quality of learning by making schooling more responsive to individual learners and increasing the depth of their learning experience. Innovation in the organisation of the physical resources of schools — buildings and other infrastructure — has become a central concern in new and reorganised schools. New design principles take account of the potential of information and communication technologies, professional learning/teaching teams, different modes of learning, study/homework centres and so-on.

Other organisational reforms are based on the notion of schools as outward-looking institutions with disappearing borders. They utilise the resources of the community and in turn may become a resource for the wider community. Students at risk are supported by multi-agency teams linking professionals inside and outside the school. Some schools have co-located community services and are used by the community after school hours. Productive networks are also being forged with other educational institutions (schools, universities and TAFE institutes), industry, local government and through globalised cyberspace.

The following articles explore the potential of "organisation of learning" innovations and initiatives (both positive and negative) to transform schooling. Taken together they paint a picture of a school system gradually re-inventing itself.

Tom Bentley leads the charge, with a call for a new approach to address the "bureaucratic resilience" which serves to resist changes to schooling. He outlines an emerging model of system change. It is guided by long-term learning outcomes, driven by the demands of learners and "funders of learning" and characterised by "open" innovation and collaborative learning networks. He uses the City of Hume's Global Learning Village as an illustration of how systemic innovation can occur.

Stephen Lamb raises concern about the Victorian Government's decision to

increase the number of selective entry secondary schools and sees it as a further move away from the system of comprehensive schooling which developed in the state in the 1980s. Research shows that selective schools reduce system-wide school performance. They also promote social and educational inequality by giving advantages to a number of individual families at the expense of government students as a whole.

Prakash Nair and Annalise Gehling argue that the organisation of existing secondary schools is outdated and reflects industrial age concepts better at enforcing control than enhancing learning. New school designs and organisational relationships are emerging which facilitate creativity and innovation.

Neil Hooley explores the ideas of Seymour Papert and their potential to engender a real "education revolution" in schools. This would mean learning processes which are active, based on experiment and reflection, and organised around small groups of students in small schools.

Viv White outlines the educational philosophy and practice of the Big Picture school movement in the United States and its development in Australia. Big Picture schools offer new approaches to learning for those students whose needs are not being met by the way most schools presently operate. They combine academic work with real world learning and are built around concepts such as small size, enhanced student-teacher relationships, personalised learning, vocational learning and links to the community.

Kathy Walker identifies the difficulties created by having a gap between kindergartens and primary schools. She outlines existing initiatives taking place to integrate the two sectors and explains what else needs to be done.

Annette Gough writes about the changing nature of teacher education programs. She identifies the impact of: changing student backgrounds (the arrival of "digital natives", the importance of part-time work etc), the increasing online presence of courses, the changing nature of the practicum and the new demands of the Education Department (VELS) and the VIT (standards).

Jane Edwards describes a teacher education initiative from RMIT University which brings groups of student teachers into a primary school to increase the motivation and confidence of both school students and teacher education students in the learning and teaching of science.

The final article is the second instalment of an interview with the noted Canadian educationalist Ken Leithwood. In this instalment Leithwood focuses on what works in improving student learning. He emphasises factors such as the approaches to learning taken by teachers, the academic emphasis of the school, the positive role of parental involvement and the importance of a collaborative culture.

Open Learning:

A systems-driven model of innovation for education

TOM BENTLEY

IN VIRTUALLY EVERY country, rich and poor, political leaders are now on record declaring that education is their number one priority. Global change puts education in the spotlight. In the richest countries, it is seen as the route to sustained prosperity. In those catching up, it is the spur to development. As economic competition and social dislocation intensify, so the pressure on publicly-funded education systems to improve their existing performance and to meet new needs will continue to grow. Given these pressures, it is remarkable how resilient the bureaucratic model remains.

In general, industrialised (and now developing) countries have moved towards more explicit outcome standards and performance measures for students, teachers and schools, while devolving control over other resources directly to schools and allowing greater local flexibility. In some countries, including the US and Australia, this has been accompanied by the liberalisation of school supply through a mix of deregulation and funding policies to cultivate and incentivise the growth of non-state schools. But even where marketisation has gone furthest, the range of basic schooling models and the structures used to co-ordinate them, have changed little.

A new educational paradigm has been anticipated, its features hotly debated, for

at least a generation. The challenges and needs being placed before schooling are making the dominant forms of system and reform intervention gradually obsolete, and set out an emerging model of system change which may come to replace them. In a new way, school-age education systems can become the fuel of economic prosperity and the binding agent of social wellbeing. Achieving this goal in the 21st century depends on identifying and harnessing a particular approach to innovation and system change to recreate the parameters of teaching, learning, participation and organisation.

The systemic approach required is one of open innovation, driven by demand from both learners and funders of learning, and carried through collaborative learning networks, in which new practices, organisational methods and specific models of schooling are generated at smaller scale across the system. Then, through a process of continuous diffusion and adaptation, these practices and methods are incorporated directly into the whole system of governance and school organisation, influencing larger scale reform.

In this model, schools operate with a high degree of flexibility, but are governed through frameworks which create strong interdependencies with each other and with other institutions and sectors. The design of governance regimes therefore helps to create powerful shared responsibilities and accountabilities, but explicitly seeks not to discriminate between different sectors of schooling. Schools are not the only (and in some cases, not the main) institutions of education provision. Change is driven not so much by the constant imposition of external requirements to comply with, as by the continuous process of innovation and adjustment by organisations and teams within the system itself. The focus of policy and strategy is to ensure that such adaptation is guided and shaped by long term learning outcomes, and not by vested interests or survival values within the existing institutions.

The crucial features of this approach to innovation are: first, that the "innovation system" on which education rests is an open, not a closed system; it can draw better knowledge and practices from anywhere and test them against its desired outcomes, and it can treat resources beyond the formal organisation of schooling, such as family engagement and community structure, as factors within its reach. Second, rather than trying to incorporate innovations into the standard bureaucratic, institutional model of schooling, governance and coordination structures can adjust and update themselves in response to shifts in practice and emerging patterns of activity, as in the best systems of continuous learning built in other sectors. If we can recognise and develop the essential dimensions of this approach to educational innovation, we can also begin to locate within it other more specific features, such as the role of ICT platforms, of desirable assessment practices, of cross-organisational networks and clusters and of evaluative data. But without the right kind of approach to system design, none of these other components will be able to achieve what they promise for learning outcomes.

INNOVATION THROUGH COLLABORATION: LEARNING FROM OPEN SYSTEMS

Melbourne is known as one of the world's most liveable cities. But Hume is not what

most people have in mind when they think of Melbourne's famous cafés, leafy boulevards and stunning beaches. City of Hume, a local government in the metropolitan area north of central Melbourne, is characterised by huge ethnic and cultural diversity and by a widespread economic marginalisation. It includes Broadmeadows, site of a Ford motor manufacturing plant, which is an important source of jobs and investment, but cannot sustain the whole of the local economy. Hume also includes Melbourne International Airport, a crucial economic asset and source of thousands of jobs.

Hume exemplifies many features of the new global economy: diversity, inequality, dynamism, and economic activities which do not neatly fit into an idealised, traditionally planned definition of place or community. Some 35 different languages are spoken by its people. But their achievement is limited by Hume's location, which makes many job and learning opportunities difficult to access, and by the impact of economic disadvantage and social fragmentation. School reform to drive up standards would be an obvious way to tackle this challenge, and improved schooling outcomes are high on the agenda of both the State Government and the local council. But Hume has also chosen a different kind of response: the Hume Global Learning Village™.

The village strategy is exemplified by the Global Learning Centre, a sleek steel and glass building in the town centre, which stands in visible contrast to much of the infrastructure around it. The centre is a deliberately designed hybrid: it houses the Council Chamber, a welcoming café, and a public library. It provides conference and seminar facilities available for hire, and internet services for local learners, whether teenagers using them after school, mothers learning English, or workers looking to improve their ICT skills. As Vanessa Little, the learning community's general manager, explains, there are so many kinds of community resource in the building that there is very little space for her own team.

But there are good reasons for the close proximity of so many different functions. The centre is just the hub of a much more ambitious strategy to link together the traditional elements of Hume's educational infrastructure — schools and colleges — with many other activities and sites of learning that can impact positively on the achievements, aspirations and life-chances of Hume's residents. *Learning Together*, Hume's introduction to its strategy, sets out a vision of "a learning community where people embrace learning as a way of life, for all their life, thereby creating a community that values learning as the key to strengthening individual and community wellbeing". The evidence shows that learning can achieve all these things; but not necessarily when it is systematised and institutionalised by our current models of schooling and governance. Hume's strategy is to transform and enhance what is achieved within its education institutions by linking them to its wider communities in new ways.

This means myriad projects, organised around a series of themes: inspiring lifelong learning; learning in community settings; language, literacy and numeracy; ICT uptake; and village networking. Threaded through them is a hard, practical focus on developing skills and learning with tangible benefit to learners. But the activities reach into places where the traditional bureaucratic model rarely gets; recruiting women from new migrant communities to create digital records of songs, stories and oral history; attracting teenagers in to download, create and exchange their own learning

materials; holding an annual State of Learning research conference; mentoring and "inspiring learners" programs that put high profile individuals who grew up in the area in touch with Hume's current youngsters.

Many of these activities are familiar to education practitioners. But there are few places in the world where such a range is systematically connected to the development of formal education services and infrastructure. Hume's model for doing so is to have built a wide-ranging partnership of institutions, a network capable of coming together to raise money, offer shared services and plan new infrastructure collaboratively. As part of the same regeneration process, many of Hume's government schools are being rebuilt and reconfigured into a smaller number of "learning centres" designed to offer higher quality pathways to all students.

The Global Learning Village does not act as a traditional corporate or bureaucratic centre; when it needs a legal entity to form a partnership or bid for funding, one of its network members steps forward. It is not a direct replacement for the existing governance of institutions or service providers; but by designing itself to further the whole population's learning interests, it can bring these other institutions together in ways that create entirely new possibilities.

The Hume Global Learning Village is an illustration of how open systems of governance and learning can support more ambitious educational objectives. It uses practice-based innovation to generate collective and institutional action to change the *context* in which personal experience and service delivery occur. It does this by seeking to adjust the broad institutional parameters within which the ongoing, incremental processes of educational attainment are organised. Crucially, it connects the workings of formal education providers with the many other dimensions of learning and sources of innovation that exist beyond their formal boundaries. It seeks to create community, as well as to serve it.

This approach, in turn, depends on a distinctive form of *innovation system*, which reflects recent thinking about the innovation process which draws explicitly from the study of systems. The dominant assumptions about innovation, and its sources, which have dominated the educational debate up to now, are threefold:

- Innovation arises from competition between schools, or from "quasi market" policy measures which replicate the effects of open competition, such as publishing performance league tables
- Innovation arises from new knowledge, primarily created upstream from teaching and learning in the fields of basic research. For example, advances in neuroscience or in ICT create insights about the nature of learning which can be fed scientifically into the design of curriculum, teaching and assessment programs
- Innovation arises essentially from the interaction between teachers and learners; it is context-specific, and cannot be generalised in ways that go beyond professional judgement and discretion; it therefore emerges from the bottom up, and should be recognised and rewarded by policymakers.

Each of these has some truth. But none has proved itself capable of fuelling the kinds of innovation that learners need, given the schooling systems that we have. More

likely is that each needs to find its place within a larger, more robust schema of how multiple sources of innovation can work as part of a more robust *innovation system*. Such a system would work to resource, share the risks of, evaluate and scale up new knowledge and practices in a given field of operation.

Innovation can come from multiple sources; but it is best understood as the product of dissonance or incongruity; the clash between expectation and reality, or the gap between the ideal standard and the particular form. Hume's innovation is perhaps a response to the gap between the diversity of its community and the institutional capacity available to support its development. In successful learning systems, dissonance is not screened out or neutralised, but incorporated as the stimulus for a continuous pattern of experimentation, evaluation, collaboration and exchange which leads the system on to ever more successful configurations.

As argued in a recent pamphlet, making the most of potential discovery and innovation in education requires a system which:[1]

- Is clear about long term, system-wide priorities
- Invests in rigorous basic research without attaching the wrong strings to it
- Expects multiple failure and incentivises continuous experimentation, but ensures that valuable feedback from users flows through the system
- Harnesses the benefits of central direction, market competition, and open communities of collaboration in appropriate ways
- Makes knowledge and new applications available and transparent in quick, easy, and interactive ways
- Makes the most of user-driven innovation and demand to shape new methods and create knowledge that centrally-driven discovery and development would miss.

These characteristics will be familiar to many educators and policymakers, but they are rarely brought together systematically. It is becoming possible to design and develop large scale systems for innovation and learning which harness the benefits of open participation and still manage to focus on identifiable, long term, public goals.

It is possible because the study of adaptive systems is coming together with the emergence of more open models of participation and innovation, typified by the open source software movement, but extending far beyond the world of computer science. A huge range of fields and institutions, including schools and universities, are now actively developing "open" methods and models of coordination and exchange on a large scale. As Henry Chesbrough puts it:

> *Now it's about harnessing the most effective sources of innovation — from wherever they are derived. This is not just about ideas — it's about their realisation. Organisations are porous, creating start-ups to exploit new technologies or bringing them into the fold.*[2]

Charles Sabel the US political scientist, argues that:

> *These federated organisations respond to the problem of bounded rationality not primarily by decomposing complex tasks into simple ones, but*

rather by creating search networks that allow actors quickly to find others who can in effect teach them what to do because they are already solving a like problem.[3]

This kind of thinking is reflected in the focus that CERI, and some OECD member states, have put on growing collaborative learning networks, such as the Networked Learning Communities program in the UK and the many other examples emerging around the world.

If we want to understand properly the interrelationships between education, society and economy, we have to view school systems as part of a more open set of relationships, characterised by complex causal development. These systems are increasingly open; unbounded, interconnected, and driven by patterns of exchange — both competitive and collaborative — which emerge from the interaction of millions of participants.

ENDNOTES

1 Gillinson S and Bentley T, "A D&R system for education", Innovation Unit, 2007, www.innovationunit.co.uk/

2 Chesbrough H, "The Era of Open Innovation", *MIT Sloan Management Review,* 44(3), Spring 2003.

3 Sabel C, "Beyond Principal-Agent Governance: Experimentalist organizations, learning and accountability", WRR discussion paper, *www2.law.columbia.edu/sabel/papers/Sabel.definitief.doc*.

Selective-Entry Schools:

the need for a re-think

STEPHEN LAMB

IN VICTORIA WE have worked hard to build a system of comprehensive government secondary schools. We did so in the belief and with the commitment that secondary schools need to be high quality and at the same time democratic, open to and able to serve all members of the community: they need to work for all. They could do this if they were set up and resourced as key local community assets capable of providing quality programs that could address diverse needs. It led to important developments including, in the 1980s, the abolition of technical schools in favour of general secondary schools and the introduction of a new senior secondary school certificate capable of accommodating a broad range of students with diverse talents and interests. Comprehensive schooling was viewed as a strength of our system and, while not yet fully realised, had the potential to be the fairest and most effective model of provision.

However, all the effort and advances that were made have come under threat recently from a range of dubious policies. One is the expanded government funding of private schools which has fuelled enrolment drift and promoted segregation. Some private schools now operate with recurrent funding levels two to three times higher than those of most government schools, while creaming off many academically capable students and those from wealthier families. Another is the adoption of market-driven philosophies, such as the introduction of the Schools of the Future model of school-based management, the abolition of school zones, and the promotion of open competition between government schools as a strategy for delivering efficiency and effectiveness. This has led to some schools, mainly in middle class areas, growing

and becoming stronger while other schools, more often those serving poorer communities, are drained of students and resources and struggle to survive.

But there is another recent policy change that is a threat, a major threat, to the development of our comprehensive government school system, and that is the policy of increasing the number of selective-entry schools. Announced during the last state election, the number of selective-entry schools is to be doubled over the next few years with a large increase in the numbers of students that will be drawn away from other schools. It is worth looking at the likely impact this new policy will have and then at the alternatives the government should be pursuing if it wants to promote effective high quality government schools for all Victorians.

SELECTIVE-ENTRY SCHOOLS WILL REDUCE GROWTH IN LEARNING AND ACHIEVEMENT LEVELS

Some nations use schools, particularly secondary schools, to separate children from each other. This is a form of *institutional segregation* which refers to the extent to which young people are separated into different schools or streams and tracks on the basis of the schools, programs or qualifications in which they enrol. In some systems this can occur early and extend well back into the junior secondary years or even into primary school. In Germany, for example, it is common for many students to be separated at the end of primary school into different schools based on students' interests and aptitudes. Schools tend to be divided into those offering a more academic curriculum (*Gymnasium*, university-preparatory), those offering specialist technical training (*Realschule*) and those with a more vocational focus (*Hauptschule*).

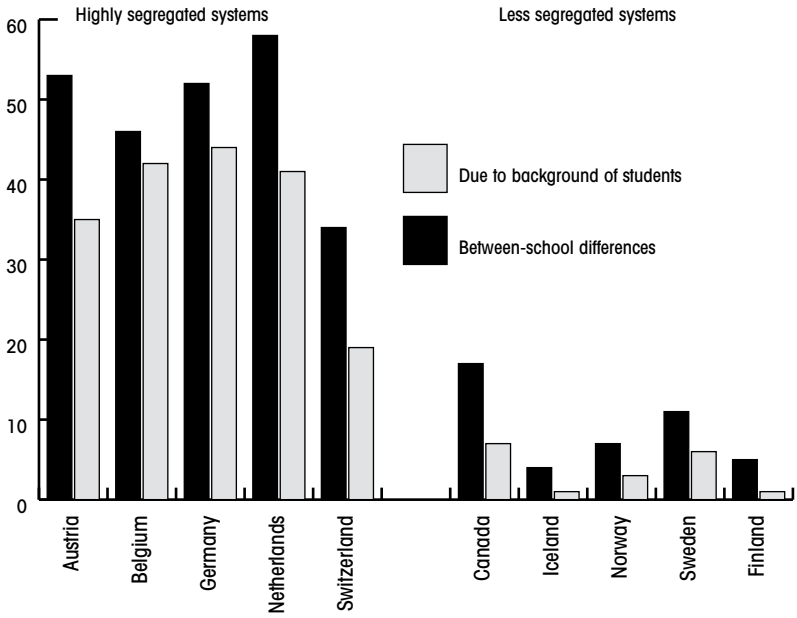
In Austria, at the completion of primary school (which is at the end of Year 4 when most children are 10 years of age), the majority of students are separated into two types of lower secondary school: a general secondary school or *Hauptschule*, and an academic secondary school (*allgemeinbildende höhere Schule*).

About 30 per cent of students enter "academic" secondary schools, selected on the basis of their primary school results or admission tests. The remaining 70 per cent largely go to general secondary school.

Switzerland, the Netherlands and Belgium provide other examples where such selective practices are used.

What is interesting is the effect such segregated systems have on patterns of achievement. Figure 1 shows some results for maths achievement of 15 year-olds from the 2003 PISA study. It displays levels of between-school variation in maths achievement for selected OECD countries. The between-school variance is the amount of difference in student achievement that is due to differences between schools, rather than to differences between students. The darker bars show the level of variation in maths scores that is due to differences between schools. The lighter bars show how much of the variation is due to differences in the backgrounds of students, mainly by socio-economic status. The countries with selective entry school policies (highly segregated) are presented on the left. Countries with more comprehensive school systems are presented on the right.

FIGURE 1: BETWEEN-SCHOOL VARIANCE IN MATHS ACHIEVEMENT: 15 YEAR-OLDS, PISA, 2003 (%)



Source: OECD (2004) Learning for Tomorrow's World: First Results from PISA 2003. OECD: Paris.

Countries which use more selective policies and separate children earlier based on aptitude and interest show much larger gaps between schools than countries that have non-selective education systems. Approximately 52 per cent of the variation in maths achievement among 15-year-olds in Germany is due to between-school differences. In Austria, the rate is 53 per cent and in the Netherlands 58 per cent. Compare these to the results in countries with comprehensive schools where children remain together through to the end of compulsory schooling. School differences are minimal, as low as 4 per cent in Iceland, 11 per cent in Sweden and 17 per cent in Canada.

The importance of the results is that in countries such as Canada, Norway and Finland, it matters much less which schools students go to. All schools tend to deliver similar quality of learning and achievement. This is not the case in highly segregated systems like Germany, Austria and the Netherlands. Achievement in systems which have selective school policies is much more dependent on the school you get into.

What is the effect of this on overall levels of performance? Evidence from an international comparative study suggests that countries which use selective school policies, such as Germany and Austria, tend to have large gaps in achievement and do less well overall. A report released in 2005 by the American National Bureau of

Economic Research, using cross-country comparisons of school achievement, found that systems which separate students through selective schooling or streaming tend to have larger achievement gaps between groups of students, compared to countries which do not use these practices (Hanushek and Woessmann, 2005)[1]. The report concludes that selective schooling practices tend to reduce mean levels of school performance system-wide, even if students in the selective schools do well on achievement tests and final year results.

This evidence suggests that increasing the number of selective-entry schools in Victoria will not raise but will actually lower the overall quality of learning and achievement across our system.

The evidence from our own system suggests that the supposed benefits of selective-entry schools in promoting higher achievement levels are not real. Work conducted for separate studies has found that when it comes to final year results, selective-entry schools in Australia may not "value-add"[2]. Using appropriate value-adding methods to control for the backgrounds of students, the results show that the achievement of students in selective-entry schools is at expected levels. This means that the students, given their ability levels, get the Year 12 results we would expect them to get, but not much more. The students would also do well elsewhere.

But removing these students from other schools tends to "bleed" the other schools of their best students and lower their levels of achievement. It is not a zero-sum game, but one that leads to loss both for the schools that lose their students to selective-entry schools and for the system overall.

It is not only academic achievement that we need to consider. Countries that select students early based on ability target a small group of privileged students towards university and, for the rest, mainly towards the labour market. One of the consequences is that rates of entry to university for these countries tend to be well below OECD averages.[3] In Germany and Austria, for example, the number of students entering university each year is more than 17 percentage points below the OECD average. Compare this with countries that have comprehensive school systems such as Sweden, Finland and Iceland where university entry rates are more than 20 points above the OECD average (and more than double the rates of Germany and Austria). Students from poorer backgrounds have much more chance of getting into university in countries that do not have selective schools.

Increasing the number of selective-entry schools in Victoria will not improve the achievement levels of students in government schools and may well undermine them. They may also weaken our long term efforts to improve access to university for a broader range of students, at least based on the experiences in other countries.

SELECTIVE-ENTRY SCHOOLS WILL PROMOTE SOCIAL INEQUALITY

As well as showing percentages of between-school differences in maths achievement, Figure 1 also shows how much the school differences are due to students' socio-economic backgrounds. In other words, it measures how much the school effect is due to the fact that selective school practices lead to students being separated on

the basis of their social backgrounds. It is evident that there are marked differences among countries in the percentage of between-school variation that is due to socio-economic background.

It shows that in some countries selective schooling leads to students being highly segregated along socio-economic lines. Perhaps this is not really surprising, but the magnitude of the differences is striking. In Austria, Belgium, Germany and the Netherlands, the relationships are substantial. Social differences in intake account for much of the between-school differences in all three countries — 44 per cent in Germany, 41 per cent in the Netherlands and 35 per cent in Austria. The rates are much lower in the nations that have adopted comprehensive schooling as their model of provision. In Canada, Norway, Iceland and Sweden, the social background of students amounts to less than 8 per cent of the between-school differences.

Rather than open up opportunities for the poor and expand opportunities across the social spectrum, selective schools tend to intensify social gaps and promote social inequality. This is because, while influenced by conditions outside of school, when students are sorted on the basis of test scores they tend also to be segregated on the basis of race, ethnicity, and social class. All the evidence we have on the students in selective-entry schools in Australia shows this to be the case. Thus, there is a huge risk that extending the number of selective schools will further entrench a two-tier system of government schools: one set of schools for the academically selected, largely middle class, and one set of schools for the rest.

In this situation social and educational inequality will increase. Instead of promoting a fairer system for all, we will create further injustices.

COMPREHENSIVE SCHOOLS PROVIDE A BETTER MODEL

If we wish to treat students differently then we need to satisfy two tests. The first is that it should provide clear benefits to the students who are to be treated differently. The second is that it should not disadvantage those who are left.

There are grounds I believe for the differential treatment of some children. A clear example is provided by some categories of children with disabilities. There are instances where it is better to pool the resources for students with particular needs, such as, for example, those who are blind or deaf and those with severe physical and mental incapacities. Resources and facilities for these students may be spread too thinly in mainstream schools. Separate schools geared to the needs of such students may well better serve their needs, while not disadvantaging those in mainstream settings. However, this should not be pushed too far. In other nations, such as Norway, integration is seen as a major responsibility of all schools and there are few specialist schools.

There are no grounds I feel, however, for separating students into different schools on the basis of test scores.[4]

All secondary schools aim to promote good Year 12 results. There is no division of labour here. It is a goal that we set for every secondary school in the state. We provide resources for schools to promote this, including additional funds in disadvantaged settings. It makes no sense therefore to make the task harder for many schools

by drawing away their highest achievers. This practice gives advantages to a number of individual families (mainly better off families), but delivers no benefits to the state as a whole.

What we need to do is return to the challenge of the past, one we seem to have abandoned, of establishing a robust school system based on a comprehensive school model. There are several successful models around the world that show us that this can work. France, for example, while its system may have other problems, has held on to a model in which comprehensive schools serve local areas and are open to all. There are no selective-entry schools. The Scandinavian countries follow these principles as well. Canada operates a comprehensive model for its school system. These countries do very well on international comparisons of student performance. They have accepted that learning in shared settings — where the presence of strong learners is a source of support and encouragement to weaker learners — is the fairest and most effective model of provision.[5]

We need to follow the same principles. The challenge we face in the future is to promote a high general standard of learning and achievement for all, not just the selected few, and to narrow the large gaps in achievement that exist across different groups of children in Victoria. This will mean exposing all children to challenge. We cannot do this if we operate a network of selective schools separating children from one another. Rather it will be necessary to ensure all schools are equipped with the resources and programs to enable them to deliver high quality teaching and learning. This needs to occur in shared settings with schools that are widely accessible for all within local communities and not depleted by the operation of selective-entry schools which serve the needs of the few over the many.

ENDNOTES

1. Hanushek, E & Woessman, L. (2005) *Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence across Countries*. American National Bureau of Economic Research. Paper No. w11124. Available at: http://www.nber.org/papers/w11124
2. The results were recorded by the author in a review of equity programs undertaken for the New South Wales Government, and in a study of school effectiveness for the Victorian Government.
3. Figures on access to university are reported in OECD (2007) *Education at a Glance: Education Indicators*. OECD: Paris (see Table C2.5).
4. I would extend this point to include the Select Entry Accelerated Learning (SEAL) programs and like schemes, which many schools now operate.
5. This point has been made in a recent study of the Scottish school system. Teese, R (2007) *Quality and equity of schooling in Scotland*. (Reviews of National Policies for Education). OECD: Paris.

Accommodating an Education Revolution:

How Victorian schools are reorganising for the 21st century

PRAKASH NAIR AND ANNALISE GEHLING

THE VICTORIAN GOVERNMENT'S *Building Futures* program is an opportunity to do far more than simply make school buildings nicer. Making the environment nicer is likely to temporarily raise student achievement but Victoria wants more. Several Victorian schools have therefore made the decision to go much further and create learning environments that are truly student-centred and geared to the needs of 21st century communities. To understand the new direction that the Victorian communities are taking, it will be useful to see why schools look the way they do today in order to recognise the imperative for transformational change.

The first large secondary schools married industrial-age concepts to a process that had existed in a far more informal way for centuries. They were built around bodies of knowledge, and assumed that transfer of knowledge occurred simply through telling. The secondary school became a conveyor-belt for pouring all the necessary bits of information into each student, a system also known as Paulo Freire's "Banking Concept"[1].

Of course, teaching is an art, not a station on a conveyor belt. Learning is a far more complex concept than memorisation. Since the inception of formal schooling, teachers have refined their techniques, developed and practised new pedagogies and doggedly pursued excellence for each child. Constructivism, which views the student

at the heart of the learning process, is entirely different to the teacher-centred "mug and jug" theory that drove the design of the first classrooms.

Yet the structures of our schools haven't changed much either in physical or managerial terms. The vast majority of this innovation has been attempted, successfully or not, within the boundaries determined in the Fordist era — a box-shaped room, or series thereof, each with 20-30 students, all the same age, with one teacher. Like a prison, the design of these schools is based on the desire to enforce control, rather than to enhance learning.

It was the Industrial Revolution that led to the architectural model of schools we know so well today. The revolutions of our current age are similarly enormous. Daniel Pink, in *A Whole New Mind,* clearly identifies the major global shifts affecting Western economies today: shifts that mean our most lucrative resources are innovation and creativity, not goods or services relying on recall and standardised processing of facts. We are also growing more accustomed to receiving the information we need on an issue "just in time", critically analysing the many sources available to assist with our problems and using known and unknown physical and electronic networks to help us. Even the most conservative predictions about the future tell us that this is just the beginning of an accelerating process of change that will turn the world we know today upside-down. It's time for our schools to at least wake up to if not fully mirror these revolutions.

There are several building blocks common to each of the new developments in Victoria. Here's a small glossary outlining the new spatial and organisational features the new schools provide.

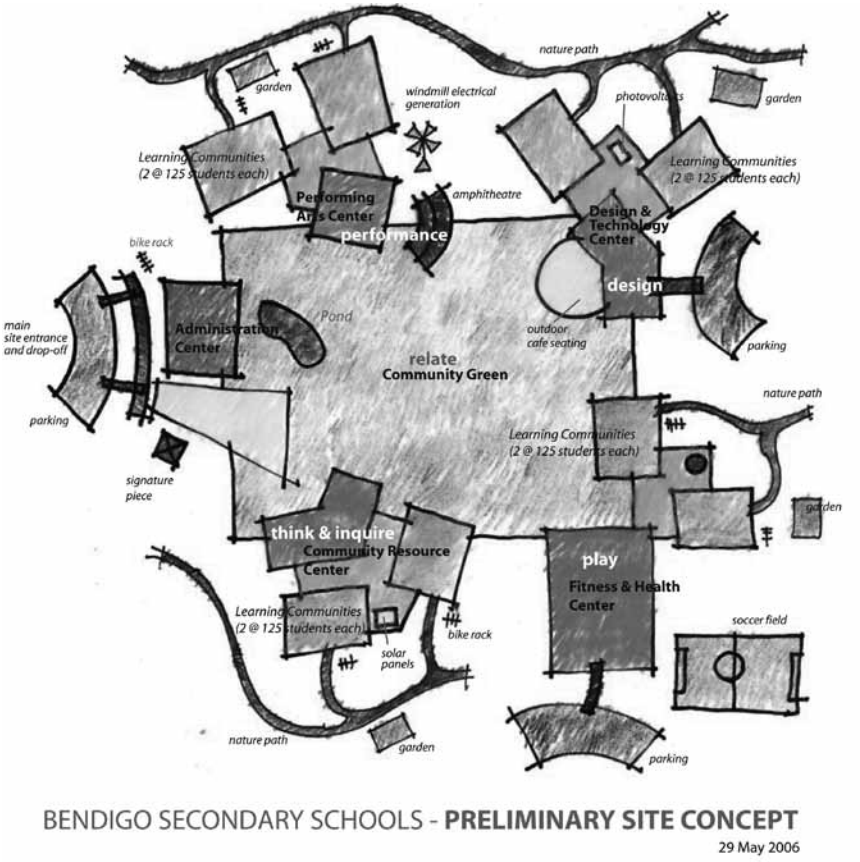
SMALL LEARNING COMMUNITIES

The term "small learning community" has been in use around the world for several years and refers specifically to a "school within a school". Because the community within the SLC is largely autonomous it is a solution to the problem of anonymity within large schools, but since SLCs are co-located on a campus they can share many facilities that haven't traditionally been available to smaller schools. Each SLC is comprised of 80-150 students (optimally 125, maximum 150) with an allocation of interdisciplinary teaching and support staff. It's up to the school to determine whether the SLCs are mixed-age or not, and how many year levels they encompass.

Because the number of students in each SLC is limited, the people for whom it is a principal learning/teaching space are socially accountable to each other. Under the SLC model, it is far more difficult for a student to slip through the cracks socially or academically, and the propensity for vandalism is minimised.

Some schools also allocate each of their specialist facilities to an SLC, thus extending the stewardship of space. In Bendigo, each of the secondary schools has eight SLCs, with a pair of SLCs forming a neighbourhood that identifies primarily with, and is co-located with, one of the school's specialist facilities.

Every teacher knows that "upping the ante" in a confrontation with a student is unwise. School design that attempts to control students is an important and not-so-subtle message that the "ante is upped"! It sends the message that "you need to be



"Schools within schools": Small Learning Communities as part of the plan for Bendigo 7-10 schools.

controlled", and that learning only happens in lessons, in classrooms and under the direct and continuous control of an adult. SLCs, on the other hand, are designed to invite self-directed learning, rather than act as a holding pen for students.

Each SLC has a number of features that make it able to support one community. This includes several connections to the outdoors, dedicated bathroom spaces, staff office space, a storage area for personal belongings of every student in the community, full access to a dedicated set of electronic and print resources, and of course a wide variety of furniture and spaces, each supporting at least one learning modality: space designed explicitly for messy work, for lecture, seminar, small group work and individual study. The space it is most similar to, architecturally and atmospherically, is a public library.

Western Heights College has developed a pilot SLC in preparation for its new campus, converting six classrooms to one SLC for its Year 7 students. This has enabled a core group of teachers to develop new operational practices that capitalise on an interdisciplinary team, a team-built timetable and a variety of spaces. The results here have been exemplary (2006, 2007 Attitudes to School surveys). Some other Victorian schools using the SLC model already are Karingal Park Secondary College, and Wooranna Park Primary School.

The structure of team-taught small learning communities at Wooranna Park Primary School enables this teacher to focus fully on work with these three students without also having to actively supervise another 20.

ADVISORIES

Advisories are an evolution of the traditional home group unit. Some schools will adopt the term "Advisory", and in others the term "home group" will continue to be used, albeit to refer to an evolution of the concept. An advisory is a group of students with a pastoral/mentoring relationship with one of the SLC's adults. This adult is someone they meet every day, with whom they work on setting goals and assessing achievements, perhaps formalised through the use of Personal Learning Plans (PLPs). The advisor's relationship with a student is such that they are ideally placed to coordinate the monitoring and assessment of a student's performance on the VELS interdisciplinary and physical, personal and social learning strands. Students within advisories will also, typically, from strong bonds with each other and thus make the experience of schooling more enjoyable, creative and secure.

PERSONAL LEARNING PLANS

Approximately weekly, or perhaps more often for students requiring additional support, each student has a meeting with his/her advisor to share reflections on the learning accomplished during the week, and goals for the weeks ahead. The formal record of this comprises a student's Personal Learning Plan (PLP), which helps to form a crucial record, along with portfolios, of a student's progress.

Because the PLP is a record attributed to each student, rather then each class, and is grounded in the state curriculum, it is able to value the passions and talents, and acknowledge the weaknesses, of its owner.

TEAM TEACHING

In the SLC, a team of teachers with a variety of expertise (ideally complemented by non-teaching community members) are responsible for determining the formal program of the SLC.

Here there is great scope to plan for interdisciplinary and discipline-based learning. It's also unlikely that teachers will hear the usual lament, "Oh, but we have science *and* English *and* art assignments *all* due on that day!" since the SLC teaching team is supported to work in close collaboration.

Because the architecture of the SLC allows for constant passive supervision, such as that in a library, the time that students spend working on projects can be maximised. Direct instruction can be organised to occur in spaces that most effectively support it, for instance, in a lecture theatre, seminar room or storytelling space. This can then be augmented with space in which students can pursue projects of all types, and which is available to them all day. In the secondary context, this means that instead of spending discrete units of time working on isolated subjects, they are able to allocate their time more flexibly, according to their most pressing goals, and they don't need to be continually uprooting themselves from each classroom.

A DESIGN FOR RELATIONSHIP

What this design does is privilege relationship. There is significant research showing that positive student-teacher and student-student relationships are among the most significant factors contributing to student success. Keddie and Churchill (2005)[2] take this a step further and identify three components of learning communities with positive teacher-student relationships:

- A democratic environment
- An environment of mutual respect and dignity
- Building networks of connection, support and understanding.

They identify each of these components as necessitating a shift in the perceived power structure within a school. Instead of first working on controlling students and then teaching them — an approach that implies that education is something that is done to students — learning opportunities need to be built according to the needs and interests of individual students. This was the approach taken, expertly, at High School for the Recording Arts in Minneapolis, USA, where disengaged students from minority, low income backgrounds work effectively together in a community that respects their talents and interests, and partners them to achieve their personal learning goals.

High School for the Recording Arts, Minneapolis, USA: A respectful learning environment

The design of the new schools allows teachers to work with different sized groups of students, including one-to-one tutorials and conferencing, small group tutorials, workshop-sized groups and lectures, as well as in passive supervisory roles. This is a vital feature of the new schools, not only for the immediately obvious benefit of groups sized appropriately for the specific context of different learning activities, but also because the hidden curriculum of an environment in which learning opportunities are ubiquitous, is: "We think you are a powerful learner" — not "Learning is something you hate and have to be made to do. Oh, and you have to do it in this box."

The opportunity to create an environment that explicitly reflects the learning aspirations of its community is too good to pass up. Victorian schools aren't waiting — here, the education revolution is well underway.

ENDNOTES

1. According to Wikipedia, "Paulo Freire is best-known for his attack on what he called the 'banking' concept of education, in which the student was viewed as an empty account to be filled by the teacher."
2. Keddie, A and Churchill, R (2005), Teacher-Student Relationships, in Pendergast, D and Bahr, N (eds) *Teaching Middle Years: rethinking curriculum, pedagogy and assessment*. Allen & Unwin, Crows Nest, NSW, pp 211-225

New Structures to Support Democratic Learning

NEIL HOOLEY

SEYMOUR PAPERT IS commonly known as the father of educational computing. After working with Piaget in the early 1960s, he developed the computer language Logo that enabled children to experiment with the key ideas of computer science. Papert's first book, *Mindstorms,* influenced a generation of teachers around the world as the new technologies began to flood into schools.

Like his mentor, Papert's concern has been about expression not instruction. He described Logo for example as a *language for learning,* meaning that children can both learn the language of Logo and learn in a general sense through the language. He envisaged the computer environment as a microworld featuring *objects to think with* and worked with the Lego company to design robotic projects now to be found in many schools.

With two doctorates in mathematics, Papert has attempted to find ways of combating the alienation of many children from this significant area of knowledge in schools. He noted that the word "pedagogy" is used to indicate the art of teaching, but for children, there is no corresponding word to mean the art of learning especially in a Piagetian sense. In order to fill this gap, he advocated the use of the word "mathetics".

Mathematics comes from a family of Greek words related to learning and means "disposed to learning". The word "polymath" for example does not mean someone who has studied many types of mathematics, but someone who has a broad knowledge across many domains. Supposedly, mathematicians were so confident that their branch of knowledge was the true and absolute road to understanding that the word was appropriated and used world-wide.

Drawing a distinction between mathetics and school mathematics is a useful way of considering how curriculum programs can be structured. Working mathetically would allow more time for talking about problem-posing and problem-solving situations and exploring possible solutions. Mathetics would shift the focus from the narrow application of rules, to thinking about the problem to encourage learning. Why school mathematics has generally adopted the opposite approach has always been a mystery.

In thinking about how to open up mathematics and indeed learning for all children, Papert drew upon the work of the French social anthropologist, Claude Levi-Strauss, who raised the notion of *bricolage*. In his studies of the language, mythologies and culture of native peoples in South America, Levi-Strauss saw connections between pre-science and science societies where intellectual activity involves using what you have at hand in a trial and error manner. The *bricoleur* is like the travelling tinker who thinks, improvises and acts on the problem being faced without being too concerned about the rules and regulations set by others.

Papert visualised the new technologies being used by children in this way and of establishing mathetic learning situations. He advocated small schools and small groups of students as the best practical way of organising this. He spoke of "rich intellectual environments in which not only children and teachers but also new ideas about learning would develop together. It is only in such an ecology of mutations and hybridisations of ways of learning that a truly new mathetic culture could emerge" (Papert, 1992). Here, the ideas, questions and strategies of the child are emphasised and given full authority in their own right.

Whether or not information and communication technologies are central to this approach, whether we are talking about smaller schools or small group forms of organisation within schools, the idea of *student-as-bricoleur* seems to be a significant educational principle. Restructuring schools across the curriculum to enable this experiential way of working may be difficult, but then again, many serious attempts have been made at so doing to encourage more democratic and inquiry formats. Staffing ratios may also be a factor with some additional teachers required for flexibility and diversity.

Semi-autonomous small groups could in fact replace the usual class grouping of students as we know it today. Groups could rotate throughout the session or the day sometimes working independently, sometimes with the teacher. This does not preclude working with the class as a whole, but it is intended to focus on the growing autonomy of children as they move across and between their current and emerging experience. Such arrangements could form the basis of association within large schools and

enable students to break free from the constraints of an imposed curriculum content and in effect, a constrained world view.

In his process of culture circles, Freire (1972) would also encourage small groups of peasants to discuss important issues in their lives, to describe them in sketches and to link key ideas and proposals with the written language. This is a personalised view of knowledge and learning that locates understanding within the local culture and the historical and current interests of communities. In all subjects, small group work in schools should have characteristics of this type, so that learning can arise from both personal and collective experience and from the different approaches that each child prefers.

According to Piaget for instance, children and indeed adults generally go about their learning by incorporating three main approaches. There is usually some activity with materials and words, there is some connection between what is already known and what is being encountered, and some attempt at explaining what is happening. Interspersed throughout are changes to what was originally intended, changes to the activities, changes to the possibilities and changes as to how to proceed. We see all of these processes at work whether observing children at the beach, or observing scientists in the laboratory.

What this means for good teaching is that all classes for all subjects need to combine a mix of approaches so that students can have direct experience of an idea or practice, be encouraged to discuss and reflect on that experience and make changes to see what occurs. This approach emphasises a framework of inquiry where learning evolves from personal experience and where more abstract thinking is firmly located in concrete expression. Knowledge is being constantly built by the child, rather than being continuously transmitted by the teacher.

Inquiry learning connects more closely with the life experience of children and with how the brain works. Acting as a neural network, the brain incorporates and reconstitutes experience into new patterns of understanding in a dynamic, changing process. This compares with the filing cabinet view of learning, where static copies of reality are neatly filed for use when needed. Attempting to file predetermined, abstract thought without the experience of active, concrete, experiential knowledge is very confusing, alienating children from learning and producing deficits in understanding.

Arising from an inquiry approach to teaching are inquiry approaches to the monitoring and assessment of learning and any proposals for restructuring must include a concomitant restructuring of student assessment as well. The philosophy of inquiry suggests that schooling is not so much concerned with the acquisition of truth, but the investigation of practice. The latter does not preclude the former, of course. It could be argued for example that an active process of experiment and reflection will lead to a more comprehensive and generalised understanding of the issue under study, than a mere requirement that preformed truth be accepted.

If different children go about their learning differently, if they combine active, concrete and abstract thought differently and if they construct different conclusions at different times, then it makes little sense to judge preset learning at preset times. In

fact, the education system is wantonly disadvantaging children if it attempts to do so. We need to monitor the learning progress of children in relation to agreed criteria and celebrate the learning that does occur as departure for ongoing investigation.

What happens if the process of inquiry learning results in children constructing the "wrong" ideas? Whether a conservative approach of passive transmission leads to children understanding the intended idea, is also a question to be asked. But for inquiry learning it is probably the wrong question. At any point in time, a child will have a particular understanding that progressive educators will not consider as being wrong or unacceptable. It is the child's understanding at that time and in co-operation with teacher and classmates that forms the basis for new active learning.

From an educational point of view, it is difficult to justify a strictly time-based judgement of learning and to punish children through a multi-level graded system of assessment. Apart from the doubtful accuracy of this approach anyhow, most testing concentrates on the recall of knowledge and not the more integrated, creative and imaginative areas. Here students are not penalised for being precisely wrong, but are recognised for being vaguely right. Demanding that students are precisely right reflects a cultural view of schooling where knowledge is set by the few for the many.

It is a false dichotomy to argue that student background is unimportant and that good teaching will overcome economic and social barriers. Good teaching must precisely draw upon the child's daily and family experience to engage with significant ideas and to connect current knowledge with the emerging. Students from what are generally seen as disadvantaged backgrounds are just as capable as anyone else, but schools need to provide the experiences and connections that support engaged learning.

In a major Australian study that looked at the restructuring of schools for improved learning outcomes, Kruger et al (2001) found that "discursive environments" seem to characterise the conditions under which both teachers and students learn best. They suggested that "to have a discursive understanding is to be able to answer questions why one acted in a particular way or to give reasons for an unexpected occurrence." This means that in a discursive environment teachers (and students) "transform their routinised, intuitive and even unconscious decisions into informed justification of planning, change and practice." Such approaches underpin critical inquiry learning.

There is thus a strong background of educational scholarship from Australia and elsewhere to incorporate when debating the restructuring of schools for improved learning. Levi-Strauss and Piaget are two of the giants of structuralism, while Papert has shown how such processes can guide the adoption of technologies across the curriculum. Working within discursive, mathetic, small-group or small school environments, the *student-as-bricoleur* model offers a powerful framework for the reconstruction of Australian schools.

It may be thought that these are modest proposals for what could comprise an education revolution. Inquiry teaching, learning and assessment however are not the dominant features of our schools at present. Many teachers across different subjects and year levels do attempt to work in this way, but their commendable effort is still

in the minority. The ideology and pressure of the examination system at Year 12 also exerts a powerful conservative influence for teachers and parents that is difficult to resist. But if these issues are not taken up in a serious way then any revolution in education will exist in name only.

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Small by Design - not by default

The Big Picture schools in Australia

VIV WHITE

THE BIG PICTURE wants to make schools better for all young people in Australia.

Our philosophy is grounded in educating "one student at a time in a community of learners".

Too many of our young people are failing in our schools. Schools are struggling to remain relevant to many young people and there are too many discouraged teachers.

The Big Picture Company of Australia wants to make vital changes in education by generating and sustaining an innovative, personalised system of small schools that work within the greater community.

Our public education system often cannot meet the needs of young people. While some students leave the public education system for the private system in the hope that their needs will be better met, far too many leave the public system to attend alternative programs. Many of course successfully move into the world of work.

Shamefully, for a country as wealthy as ours, far too many young people leave school without pursuing further education or employment. The personal and social effects of this are great. Usually those who do not continue with education and/or employment come from the same families with the same general demographic and socio-economic backgrounds as they did 25 years ago. Doing more of the same has not made an impact or difference on these outcomes. Therefore a new approach is called for. As a community, we need to think differently about how to deal with this dilemma in education.

The Big Picture Australia believes that innovative and diverse models are needed within the public system to meet the needs of those that the current educational model does not support. This is new thinking. No longer should the "one size fits all" model of secondary schooling be the only option for those of us who support public education. We need diversity within the education system to meet our young people's wide range of needs.

The Big Picture model aims to address these needs, focusing on individual learning and engaging students on a personal level. While we are not suggesting that we are the only model that can make this contribution to education in Australia, we do believe that this is a model that works, and has been proven and demonstrated in schools across the USA and the Netherlands.

We invite others to join us in new conversations and actions to improve the educational outcomes of so many young people in Australia. New partnerships, coalitions and funding arrangements, and school designs will be explored.

ONE WAY TO THINK AND ACT DIFFERENTLY

The Big Picture's rigorous and highly personalised approach to education combines academic work with real world learning. It focuses on educating one student at a time and inverts the traditional education model by placing the student, their passions and their interests, at the centre of the learning process. Big Picture's integrated learning framework encompasses many of the current and proposed educational reforms in Australia and overseas.

From the Big Picture's work in communities overseas, the integrated learning framework has been found to be highly effective in improving student learning. The success and proliferation of Big Picture schools is due to their ability to achieve exceptionally high student attendance rates (94 per cent on average) and very low drop-out rates (2 per cent on average). Big Picture Company delivers on its promise to provide students with the skills and assistance needed to gain acceptance to tertiary institutions, with 99 per cent of Big Picture graduates being accepted into college (the equivalent of a university or TAFE in Australia).

ORIGINS

The Big Picture Company (USA) was founded by educators Dennis Littky and Elliot Washor in 1995 and aims to catalyse vital changes in urban education by generating and sustaining innovative and personalised schooling. Dennis and Elliot began collaborating with national policymakers to design a student-centred high school and created the Big Picture Company (BPC) as the launching pad for what has now become a national education reform movement. The first Big Picture school, The Met Center, was launched in 1996 with 50 students in downtown Providence, Rhode Island. Twelve years on, The Met is now made up of a group of eight small Big Picture schools. There are also nearly 50 Big Picture schools in systems of small schools across the USA, The Netherlands and now Australia.

WHY AUSTRALIA?

In 2006, Big Picture Company Australia (BPCA) was established, in partnership

with Big Picture in the US. BPCA aims to bring the proven benefits of the Big Picture philosophy to Australia by customising the Big Picture ideas and methodologies to suit the needs of Australian students and their communities. We know we can do this within the current curriculum and assessment context for the same level of funding that each of these students would obtain in larger schools. This can be achieved by establishing systems of small schools.

There is significant room to improve educational outcomes in Australia. Currently over 14 per cent of teenagers in Australia are not in full-time learning or work (Dusseldorp Skills Forum, 2006). In addition, 20 per cent of young Australians fail to complete Year 12 or its equivalent (Business Council of Australia, 2005). This level of education is not high in comparison to other OECD countries (Sweet, 2006; Kelly, 2006). Nor are educational outcomes equitable. Indigenous people, rural populations and low economic, social and cultural status groups are all disadvantaged by Australia's education system (ABS, 2006; ABS, 2003).

In Australia, we are seeking to work with other interested parties to customise the American ideas, practices and principles for Australian students and their communities. While there are differences between the Australian and American education systems, the design principles which have been developed over the past 20 years have strong resonance with the Australian reform context.

Recent reforms in Australian education are beginning to focus on the learner and how the curriculum might be personalised to engage young people. Over the past 20 years, there have also been middle schooling reforms. Acceptance and understanding regarding the need for vocational education and applied learning in schools have increased, acknowledging that teaching "real world" skills and providing specialised one-on-one support and alternative settings for at-risk students can improve their transition into the workforce.

CORE EDUCATIONAL DESIGN PRINCIPLES

The key to success lies in fostering students' individual interests, encouraging their active participation in the learning process, and developing their ability to apply knowledge and skills to real life experiences and challenges. Each Big Picture school is open to students at all levels of academic performance, ability, interest, aspirations, and socio-economic backgrounds, with the goal of graduating each and every student from secondary school.

Small by design: The school size is no more than 150 students, with a student-to-teacher ratio of no more than 17:1. If larger groups of students need to be educated on a school site, a system of small schools is created rather than one large high school.

Advisory groups: An advisory teacher meets daily with an advisory group of 12-17 students. This is the core learning community and the centre of accountability for its member students. Each advisory teacher stays with the same group of students for two to five years. Their advisor knows them well and helps them build a strong community while working on their learning goals. Advisories also go on trips together, debate issues, do community service, critique each other's work, plan school activities, and more.

FIGURE 1: BIG PICTURE SCHOOL SNAPSHOT – WHAT AND WHY

KEY ELEMENTS	BIG PICTURE SCHOOL 'SNAPSHOT'	BENEFITS
Highly personalised	• Small classes: 17 students per class • Small schools: maximum of 150 students • Daily one-on-one help from teacher • Customised curriculum and highly personalised approach for each student • Flexible learning spaces	• High levels of student engagement • High attendance rates • Improved learning outcomes • Very high graduation rates
Adult world immersion	• Two days of industry internships each week • Authentic and meaningful work • Academically rigorous • Inquiry driven learning • No exams — students build portfolios and defend their work at exhibitions each quarter	• Immediately useful skills • Greater connection to the workforce • High employment rates after school • Development of industry mentors in areas of interest to the young person
Community connectedness	• Strong connections with the community • Parents are partners in their child's education • Parents are panelists at their child's quarterly exhibitions • School as a community resource	• Parents engaged in their children's education and can impact school culture • Social capital benefits for the school, the family and the community
Smooth post-secondary transition	• Aim for all students to graduate and continue into higher learning • Higher-ed opportunities in all four years. Most students take at least one tertiary course • College Transition Team assists in student placement and supports transition	• Very high rates of acceptance into tertiary education institutions • High tertiary education completion and graduation rates
Intellectual rigour	• Focus on both critical and creative thinking • Meets or exceeds state/territory education standards	• Strong numeracy, literacy and reasoning skills • Creative and independent thinkers • All young people guaranteed tertiary entry

Personalised learning: Each student has a comprehensive, individualised learning plan that the student crafts with the guidance of the advisor, parent or guardian, and an internship mentor. The learning plan identifies learning goals linked to communication, social reasoning, empirical reasoning, quantitative reasoning, and personal qualities and describes authentic project work that will meet these goals. The learning plan is reviewed and updated quarterly. Student educational needs in literacy and numeracy are attended to throughout this process.

Pursuing passions and interests: We believe that students learn best when they are doing something that they are passionate about in the real world. Students are encouraged to explore their interests.

Learning through internship (LTI): The LTI allows each student to spend two days a week engaged in meaningful project work in an internship outside the school building, under the direction of a mentor. The internship enables the students to pursue their interests and passions. Project work is designed to cultivate broad learning rather than focusing on the development of specific vocational skills.

The advisory teacher ensures that the internship work is integrated with the student's learning goals and school-based study. The mentor who volunteers to take on the role of directing the internship is trained by the school, participates in the school life of the student where possible and works with the student to create a learning plan that simultaneously supports learning at the workplace while also enabling the student to work on it at school and present their work to classmates at school.

Through LTIs, a student will learn mathematics, science, reading, writing and a range of other skills that he or she cannot learn effectively in a classroom. LTIs are not meant to help students pick out a particular career. Instead, LTIs provide students with the skills necessary to go on to college and beyond.

Rigour, relationships and relevance: Although not unique to Big Picture, the three key themes of rigor, relationships, and relevance are brought together in Big Picture schools through the advisory group and the advisory teacher. The advisory teacher relentlessly pursues each theme with each student and their class.

Relevance: Paying attention to the student and working with the student to discover their interests, ensuring that internships and projects are connected to these identified interests.

Relationships: Supporting the student to learn to work with peers in the advisory class, others in their school and with their mentor(s) and others in the community.

Rigour: Continually challenging students to deepen their learning and improve their performance across all learning goals, assuming and believing that all students will learn.

Authentic assessment: In addition to any national and state-mandated assessments, schools rigorously evaluate student learning and development through a variety of measures, including a portfolio of work and quarterly exhibitions. Advisors provide written, in-depth assessments of each student's progress.

Exhibitions: Students present their work and learning at the end of each quarter. Each exhibition within a school year has requirements based on the student's grade

level and the status of the individual student's project work. It is through this exhibition of work that the student demonstrates his or her accountability for all facets of the learning plan. The students, parents, peers, mentor, advisor, and others attend and give specific feedback on his or her work processes and final products. The student creates visuals, an agenda, and note-cards to create a professional presentation.

Families are enrolled too: The school enrols families so that they can play an active and important role in a student's education. From helping the student plan his or her learning plan to participating in events, parents/caregivers are an integral part of our community, actively involved in their children's education. They participate in quarterly learning plan meetings, they are involved in student exhibitions of learning and are expected to attend an orientation for new families and a number of school functions throughout the school year.

Focus on building communities: In-house school days include all-school gatherings that offer opportunities for students to showcase their work and for guests from the community to give performances and presentations. Whole community events for staff, students, families and mentors are scheduled throughout the year. These events create opportunities for relationships to form within communities, providing a supportive structure for Big Picture schools to operate in.

Eye on the Big Picture: All students who enrol with their families and engage with school in this way are expected to graduate. All students are prepared for and connected to opportunities for learning at university and/or TAFE. Some students enrol in tertiary courses as part of their school work. All students begin to research possible tertiary pathways from Year 10 onwards.

WHAT ARE WE IN THE PROCESS OF DOING?

(1) Establish at least one Big Picture school in Australia by 2009.
(2) Establish a network of Big Picture-inspired schools.
(3) Cultivate the growing body of Australians interested in learning about and applying Big Picture ideas.
(4) Contribute to the dialogue on educational reform in Australia.

We are making progress in a number of contexts. We have a growing network of members, several Big Picture-inspired schools and negotiations are taking place at the state and national level about establishing Big Picture schools. As well, we are conducting summer schools, undertaking international coaching for our principals and offering a suite of professional learning opportunities nationally, and working with universities to accredit the work. We are working with our national and international colleagues to grow our work together.

Big Picture Company (Australia) (BPCA) was established in 2006. It is based in Melbourne and is a not-for-profit organisation supported by Social Ventures Australia.

Contact: **www.bigpicture.org.au** or **info@bigpicture.org.au**

Building Bridges Between Preschool and School

KATHY WALKER

THE STATE OF Victoria has a proud and wonderful history in preschool education. So too has primary education in the state system. However, over the past 20 years, significant changes have occurred in state and federal funding, commitment and organisation that have resulted in, among other things, a significant and profound gap between preschool and primary education.

Victoria has always separated its preschool and primary systems. Preschool, or kindergarten as it is often called, has never sat within the education department. It has always been administered within health or welfare or community or human services.

Most university courses within Victoria also held separate courses for their primary or preschool education. Interestingly however, there was an opportunity many decades ago for primary teachers to specialise in what was then called an infant training certificate that covered the first three years of school. This course focused upon early childhood development, play as a pedagogy and other aspects of early childhood education.

As with many aspects of education and pre-service courses in the past decades, specialisation was replaced with more generalist courses assuming that if you could teach in Grade 6 you could teach in Grade Prep. There has been a growing

trend at some levels to assume that teaching and learning were about a range of strategies rather than strategies based upon sound knowledge of child development and the different ways young children take in, process and make sense of learning opportunities.

The gap between preschool and primary widened considerably and could almost be described as a chasm. For children moving between preschool and school, transition was simply a range of orientation sessions. As for pedagogy, similar teaching and learning, a shared or common curriculum, or sharing of information, none of this whatsoever existed. Children would enter school and face totally different teaching methodologies and very little, in most cases no, communication between the preschool teacher and the primary teacher would have occurred.

There was an assumption that the child who learned through active engagement, hands-on experiences and play at the end of one year would suddenly undergo some magical transformation and be ready to learn in a significantly more formal manner once they reached school.

The reality of course is that the child who leaves preschool at the end of one year and five weeks later commences school is the same child, with the same brain, similar stage of maturity and experience and in the ideal world would simply walk through the school door into a learning environment that complements and provides continuity in curriculum, teaching styles and pedagogy.

While it may have taken 100-plus years to occur, finally some exciting developments are starting to occur right across Victoria, in rural, suburban and inner city schools and preschools.

The early years' conference for example, which has been held for many years, is now getting hundreds of delegates, with preschool and primary teachers eager to listen, share and work together.

Local governments have taken up the initiative and hold symposiums once a term where primary and preschool teachers meet, discuss, share and find out about each other's programs. Some of these initiatives have resulted in exciting programs and achievements. One local government organised for the teachers across both sectors to write and distribute a pamphlet that discussed school readiness and school transition. This enabled a consistent and shared message to be sent to all families in that area.

Other local governments have sponsored professional development sessions on literacy, numeracy, play-based curriculum and other aspects of teaching and learning across the two sectors.

One local government has actually used the VELS curriculum framework to develop an early childhood curriculum framework so that links between child care, preschool and prep can be assured. Some local governments have sponsored the development of portfolios that move across from the preschool to the prep teachers so that information between the two can be shared.

Many schools are now contacting and meeting with their local preschool teachers. Shared information evenings are being sponsored by the schools and preschools working together for parents to attend on a range of topics such as the importance of

play, resilience, literacy in the early years and school readiness.

Much has been debated and discussed in recent years about the importance of community hubs where maternal and child health, child care, dental or health facilities are co-located.

Unfortunately, these discussions often left out the relationship between early childhood and primary education.

Therefore it is extremely pleasing and exciting to witness schools and preschools, principals, preschool directors and some cluster management groups of preschools now recognising how important it is to start to organise local networks, committees, symposiums and meetings. Shared understanding, shared language and shared values about early learning must be integral aspects of curriculum and pedagogy between preschool and the early years of school.

An early childhood curriculum that commences at preschool and links directly with the early years of school curriculum is a long-awaited need within Victoria.

Moving so quickly into the 21st century demands educators, administrators, and those in government to move swiftly away from the traditional divisions that existed between preschool and school in this state.

It is in children's and families' interests that effective and smooth transition occurs because the curriculum and pedagogy is the same.

Currently, the great initiatives of getting teachers across the two sectors to meet have taken place at the local level through some committed teachers, and/or through local government taking up the challenge and recognising that it is in their own communities' interests to have these two sectors working together. Those teachers across the two sectors have regular meetings and share professional development, and the system itself allows and provides for this.

At the current time however, we need not only good will but good management, effective systems and formalised processes that ensure that all preschools and schools are networking, sharing and working together in a similar curriculum framework and pedagogy.

My work with schools and preschools over the past five years in particular has highlighted how similar the values and hopes of teachers across the two sectors actually are. The gaps that exist are not because teachers want different things for children, but simply because traditionally each sector has been left almost completely ignorant of each other's work, approaches to learning and teaching and curriculum.

Organisation, leadership, government structures that ensure preschool sits within education; all of these issues need to continue to be addressed as a matter of urgency.

The children and families of this and future generations should not be subject to different and separate curriculum across preschool and school. The early childhood years are internationally recognised as being from birth to age 8. These years need a curriculum that focuses upon sound early childhood pedagogy. Systems and organisations need to be established now to ensure that preschool and school move in closer alignment.

The introduction in many schools of the play-based curriculum is another example

of how schools and preschools are attempting to provide continuity and consistency for children as they move across from preschool. Schools that are now using the play-based curriculum report consistently that children and families are happier, attendance is more consistent, oral language has significantly improved and the overall wellbeing of the children is higher.

However, these initiatives need to be consistent and supported by government so that all teachers and all children have the opportunity to understand and implement sound practices that complement each other.

It seems, luckily, that we have almost moved away from the old and tired argument from some that preschool education would be contaminated or harmed in some way if it sat within the education department. Strong evidence now exists that in fact placing early childhood alongside and within education provides a push-up model for the early years of school and ensures an even stronger commitment for both preschool and the early years of school.

Brain research and many international studies continue to highlight the importance of preschool education. It should not be forgotten that a preschool program and the major elements of its teaching and learning can be continued and extended into the early years of school, ensuring that young children can continue their early learning within a consistent framework.

The challenges for Victoria organisationally are that we must ensure that preschool education sits clearly within and alongside primary education as a state-based, free, accessible program for all children in the year before prep.

At the current time, affordability, access, lack of understanding of the program in relation to primary and the fact that preschool education has been with (until now) a human service department rather than education have all contributed to the decline in accessibility and affordability. In addition, these issues have perpetuated the lack of shared understandings between sectors and therefore resulted inadvertently in a lack of continuity in teaching and learning for young children across their early childhood years.

We are now in exciting times where primary and preschool education have finally placed themselves together on the map as moving in the same direction and needing a greater level of shared understanding. It is now up to the state and federal governments, and not just local government, to ensure that organisationally a system will be put in place to ensure this continues to occur and that curriculum frameworks, pedagogy and links across preschool and school teachers are assured.

"Going Native":

The changing nature of the organisation of learning in teacher education programs

ANNETTE GOUGH

IN THE LAST issue of *Professional Voice,* Sue Willis (2007) wrote on the challenges ahead for teacher education and the increasing stress the sector is facing. She discussed some of the pressures on teacher education programs from bad press, the "practicum crisis", accreditation processes and the serious under-funding of teacher education, and noted that: "Teacher education is supposed to produce teachers who can do and be everything and who can do so from their very first day of teaching" (p45).

I take Willis's statement as my starting point for discussing the changing nature of how learning is organised in teacher education programs — including both the physical organisation and the pedagogical organisation — as universities go about the task of producing "teachers who can do and be everything … from their very first day of teaching".

But what are the characteristics of our current students, and what are the implications of this for how they learn and how universities organise their learning?

LEARNING CHARACTERISTICS OF FUTURE TEACHERS

Current teacher education students — who tend to fall into the categories of Gen X and Gen Y — have different orientations to work and life. Faber (2001) identifies six characteristic values of Gen X (the generation born between 1965 and 1980):

- An orientation towards individual rather than group identification
- Little loyalty to organisations or institutions
- A preference for leisure over work
- Negative attitudes towards authority and hierarchy
- Pessimistic views towards both individual and societal financial prospects for the future
- More tolerance for social differences than older generations.

Preston (2007) investigated Gen Y (born since 1980) and found that they have similar characteristics to Gen X — and some special ones of their own, particularly their familiarity with information and communication technologies (ICTs). This group has:

- Poor spelling and grammar
- A failure to understand what constitutes appropriate corporate behaviour
- Poor communication skills.

But they do have great technological skills and they respond to electronic communication much more readily than to print. According to Preston, "it is important to constantly communicate with, train and 'indulge' Gen-Y staff to build relationships and get them enthused about being at work" — or university!

Another way of thinking of these future teachers is as "digital immigrants" (Gen X) and "digital natives" (Gen Y). Kennedy (2007) argues that digital natives are characterised by their familiarity with and reliance on ICTs, and that this has implications for their learning preferences. They:

- Prefer multi-tasking and quick, non-linear access to information
- Are adept at processing information rapidly
- Have a low tolerance for lectures
- Prefer active rather than passive learning
- Rely heavily on communications technologies to access information and to carry out social and professional interactions.

Given that current teacher education students include both digital immigrants and natives, that their lecturers and supervising teachers on practicum are most likely digital immigrants and that they will generally be teaching digital natives, what does this mean for the organisation of learning at universities?

PHYSICAL ORGANISATION OF LEARNING

University students today do not hang around campuses like they used to. Most students now work and they try to fit their university classes into the minimum number of days so they can hold down part-time jobs to support themselves through their university studies. Although this is not ideal, it is the reality, and timetables are now often organised so that students in particular year levels can have their classes over only two or three days rather than five.

Universities are also increasingly providing other flexible ways of delivering

coursework. For example, some subjects are offered through one-week intensive mode in semester breaks or over several weekends instead of weekly classes. In some universities, subjects are offered totally online so that students can complete them at any time during a semester.

Even when not fully online, it is common practice in universities for all subjects to have "a minimum online presence" — and this usually means that students are able to interact with the lecturer and each other in an online space. These interactions can involve being able to download podcasts of lectures, PowerPoint presentations or notes from lectures or readings for tutorials, or there can be activities and assessment tasks that require students to interact online to respond to a particular question or issue, or maintain an online journal or blog. These ways of organising learning are designed to encourage communication and engagement with their university studies, consistent with the characteristics of Gen Y learners outlined by Preston and Kennedy.

Of course, although e-learning is now commonplace, the next challenge for schools and universities is m-learning, "the provision of education and training on PDAs/palmtops/handhelds, smartphones and mobile phones" (Keegan, 2004, p3).

Other strategies are being adopted by universities to better engage students in their learning and better prepare them to hit the ground running on their first day in their own classrooms.

One example of this is the teaching of key subjects such as literacy, numeracy and science in primary schools and providing the future teachers with the opportunity to actually work with and teach school children as part of their own learning about teaching. Such experiences not only build the future teacher's confidence and competence in teaching subjects which are sometimes (often) seen as difficult, they also provide active learning experiences where the future teachers learn in a scaffolded environment before going out on their own in practicum experiences.

Practicum experiences are also changing. The Victorian Institute of Teaching (VIT) requirement for accredited teacher education programs is that four-year programs include at least 80 days of supervised teaching practice, two-year programs need at least 60 days, and one-year programs need at least 45 days; whereas the Commonwealth Government is increasing the requirement to 120 days for four-year programs and 60 days for one- and two-year programs. Universities are already struggling to place students: "Even with considerable good will, schools will struggle to meet the additional demands upon them, and universities risk being unable to deliver the dramatically increased number of placement days" (Willis, 2007, p48), losing quality in pursuit of quantity.

Universities and schools are already implementing a variety of delivery modes for the practicum days. These include single days over a semester followed by a short block, negotiated days over a period of a few weeks, mass placement of large numbers of future teachers in fewer schools, as well as traditional three- or four-week block placements.

What is considered as constituting a practicum experience is also changing. The recent Commonwealth *Administrative Guidelines Improving the Practical Component*

of Teacher Education Programme 2008-2011 (DEST, 2007, pp4-5) included "Teaching and education-based experiences in settings other than the classroom". This includes but is not limited to:

- Participating in an educational role in a non-school organisation, such as Questacon, the CSIRO, or galleries and museums
- Tutoring, including literacy and numeracy (through an agency)
- Supervising after-school homework centres
- Working as a school's assistant in a classroom role, eg. with students with special needs
- Developing skills to prepare for positive teacher-parent relationships
- Camp or excursion supervision
- Participating in micro-teaching or a virtual classroom exercise.

PEDAGOGICAL ORGANISATION

The pedagogical organisation of the intellectual content of teacher education programs is also changing.

Firstly, there are the VIT requirements that applicants to undergraduate teacher education programs have a study score of at least 30 and have satisfactorily completed a minimum of Units 1 and 2 of VCE mathematics (not foundation mathematics or its equivalent). In addition there is the requirement for all teacher education programs to include experiences which lead to practices within the "three broad themes and eight standards that together describe the essential elements of teaching" (VIT, 2007, pp16-17).

Secondly, the curriculum and standards framework in Victoria has changed significantly from that in effect from 1995-2005, with the phased introduction of the Victorian Essential Learning Standards (VELS) between 2006 and 2008. As Victorian teachers will be well aware, instead of the previous eight key learning areas, VELS comprises the following standards:

- Physical, personal and social learning
  - Health and physical education
  - Interpersonal development
  - Personal learning
  - Civics and citizenship
- Discipline-based learning
  - The arts
  - English
  - The humanities — economics
  - The humanities — geography
  - The humanities — history
  - Languages other than English
  - Mathematics
  - Science
- Interdisciplinary learning
  - Communication

- Design, creativity and technology
- Information and communications technology (ICT)
- Thinking processes

Some elements of VELS are already well-embedded in teacher education programs — such as discipline-based learning — but other elements, such as developing design, creativity and technology, or civics and citizenship may require significant changes to program organisation.

Thirdly, there are the changes associated with the initiatives related to the *Blueprint for Government Schools* (Minister for Education and Training, 2003), particularly those related to student learning: assessment, curriculum and pedagogy. These changes include three major initiatives that have been implemented in the past two-to-three years:

- Interpreting an assessment definition and purposes of assessment including: assessment for, as and of learning
- Curriculum planning guidelines
- Principles of learning and teaching.

As teacher education programs are accredited by VIT for a period of five years on each occasion, the organisation of learning in the programs needs to be modified to meet these changes progressively.

Although teacher education institutions support the need for regular program renewal, just as in primary and junior secondary schools, significant changes such as the three above can have a considerable impact on staffing needs and subject design and implementation to best address these requirements.

There are also increasing requirements for future teachers to be able to interpret statistics, to understand the legal and ethical dimensions of teaching, to be able to manage students with behaviour problems and learning disabilities (up to one in six in a regular classroom) and other classroom management issues, and to handle a whole range of other social and academic issues in their teaching. The VIT characteristics of teaching that accompany the eight standards of teaching (covering professional knowledge, professional practice and professional engagement) provide a guide for teacher education programs to follow as they frame the organisation of learning in the subjects that comprise the programs. Together these standards and characteristics provide future teachers with the essentials for entering the teaching profession. The organisation of learning required for future teachers to acquire these characteristics requires partnerships between universities, schools and experiences in other educational settings through practicum and other collaborations.

Teacher education students are the learning leaders of the future, but they need to learn how to organise their learning and the learning of their future students by implementing strategies that take account of their own learning characteristics and those of their students. How students learn best is changing, and teacher education programs are evolving to accommodate the different characteristics of teacher education students — with the goal of producing "teachers who can do and be everything … from their very first day of teaching", recognising that they need to "go native".

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Working Together In Science Education:

RMIT Education and Willmott Park Primary School

JANE EDWARDS

FEW TEACHERS FORGET their first year of teaching. Along with the excitement of realising the beginning of a career, there is the anxiety of developing a professional identity and successfully putting university learning into practice, while at the same time dealing with expectations that new teachers provide leadership through introducing the most up-to-date ideas and best practice pedagogies.

This anxiety is particularly likely when it comes to science teaching. Many university primary teacher education graduates make the move to being classroom teachers lacking confidence and competence in teaching science (Gess-Newsome and Lederman, 2001). Hackling (nd) illustrates this phenomenon as a "chain reaction", where teachers do not feel confident about teaching science which leads to them not teaching science and their students having low science achievement:

Low science pedagogical content knowledge

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Low confidence and self-efficacy

↓

Low science teaching time

↓

Little opportunity for learning science

↓

Low science achievement

In an attempt to address this "chain reaction" and better prepare its graduates and to provide opportunities for showcasing new pedagogies, the School of Education at RMIT University's Bundoora campus and Craigieburn's Willmott Park Primary School recently collaborated in the development of an exciting and innovative approach to science education. This pilot program ran during Term 3, 2007, and involved over 100 third-year Bachelor of Education pre-service teacher education students (PSTs) designing and teaching a six-week science unit to 13 groups of Grade 3–6 students.

Scientific literacy is a high priority both in Australia and elsewhere, and there is pressure to improve and extend science education in order to help students to:

- Be interested in, and understand the world around them
- Engage in the discourses of and about science
- Be sceptical and questioning of claims made by others about scientific matters
- Be able to identify questions, investigate and draw evidence-based conclusions
- Make informed decisions about the environment and their own health and well-being. (Hackling, Goodrum & Rennie, 2001, p7)

However, many primary teacher education students, and primary teachers, have little experience or confidence in science teaching and/or learning (Yates & Goodrum, 1990; Hackling & Prain, 2005). This has led to a growing gap between current desired science learning outcomes and actual classroom opportunities for science learning: in Australia, an average of only 41 minutes of science is taught per week in a primary classroom (Angus et al, 2004). This means that PSTs rarely get to observe or experience science lessons in primary classrooms prior to graduating. Yet there are increasing calls for new graduates to assist schools in implementing more effective science education, as well as an expectation that new graduates are readily able to implement best practice science teaching pedagogies.

In their third year of study, RMIT Bachelor of Education (BEd) students undertake a science education course which is designed to improve their scientific understandings as well as develop their science teaching skills. This is a big task as the course challenges the students to confront their often entrenched attitudes that science is either extremely boring or excessively difficult, and to develop style and confidence in teaching science without necessarily having practical experience in teaching it. Thus RMIT sought to find a new way to organise the PSTs' learning of how to teach science by providing them with experiences of actually teaching it in a scaffolded environment.

The foundation for the collaboration between RMIT and Willmott Park was the newly developed *Primary Connections — linking science with literacy* program. *Primary Connections* was developed jointly by the Australian Academy of Science and the Australian Government Department of Education, Science and Training (DEST), specifically to assist introduction of best-practice inquiry-based science teaching and learning throughout Australian schools, particularly by teachers not familiar or comfortable with science. *Primary Connections* achieves this through modelling the use of the 5Es learning and teaching model which identifies five essential compo-

nents for effective constructivist science learning (which link learning, teaching and assessment):

- *Engage* — activities to stimulate student curiosity, and assess students' prior knowledge, interests and learning needs (diagnostic assessment)
- *Explore* — practical opportunities for students to explore a concept in ways that challenge pre-conceived ideas, encourage collaborative learning, and assist with the formulation of new questions. Teachers have the opportunity to explore alongside their students
- *Explain* — teachers work with students to develop an appropriate science understanding of the concept being explored (formative assessment)
- *Elaborate* — opportunities for students to consolidate and/or extend their understanding by investigating their own questions and ideas prompted by *Explore* and *Explain* (summative assessment of the investigating outcome)
- *Evaluate* — activities designed to assist both teachers and students to evaluate the learning achieved (summative assessment of the conceptual outcomes).

The use of the 5Es pedagogical framework, as modelled by *Primary Connections*, proved highly successful in assisting PSTs to begin their journey to becoming effective primary science teachers. The framework helped students organise their previously unpractised pedagogical understandings in ways that ensured they incorporated an appropriate range of teacher-initiated and student-led learning within an inquiry-based, constructivist regime.

Many PSTs commented that the ability to learn science content alongside the children and tap into their interests and ideas was a highly enriching experience; one which challenged their previous ideas of what constitutes an effective classroom learning environment. *Primary Connections* certainly provided an excellent framework to assist PSTs in developing and implementing their own science units, and in so doing, introducing these ideas and pedagogies to the teaching staff at Willmott Park Primary — an excellent foundation for a learning partnership.

Benefits from this program have been widespread:

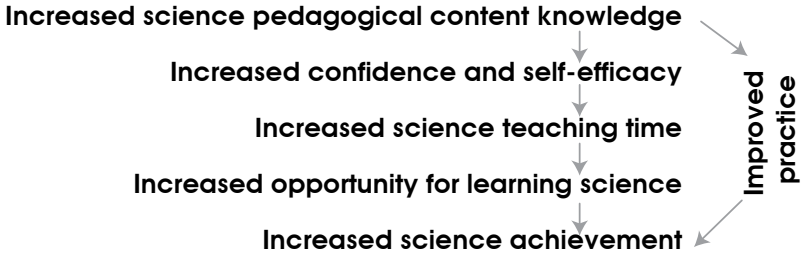
- The primary students participated enthusiastically and embraced the new approaches trialled in the science lessons. Most significantly they demonstrated a depth of new learning that surprised both the PSTs and their classroom teachers
- The growth in PST confidence in beginning to teach primary science was enormous. This is typified by Kerryn's comment: "I was able to experience having fun in science for the first time. Before this I hated science and was dreading completing this subject. This subject has allowed me to open my mind to science and I now feel that science is valuable not only for the students, but also for teachers"
- The PSTs' identities as primary science teachers developed rapidly through their experiences. That this program challenged their stereotypical misconceptions of science teaching are highlighted by Tammy's reflection of photographs taken during her science lesson, where she sees "… teachers of science … You don't have to wear a white lab coat and protective glasses and gloves to be a sci-

ence teacher. The photos from my science lessons show me dressed in casual clothes and the students participating in the day's activities. There are no test tubes, or potions or microscopes to prove it is a science lesson."

All of the science units have been collated as a shared resource, so that PSTs and teachers at Willmott Park Primary now have a selection of trialled units ready for the classroom.

Classroom teachers were surprised by how easy it was to engage their young students in learning that not only embraced science, but incorporated literacy and numeracy. For many teachers this was a great insight into ways of introducing "real science" to classroom learning, such that Willmott Park Primary will soon begin introducing the *Primary Connections* program throughout the school.

Similarly, the use of these science units by PSTs as part of their professional practice experiences in other schools has resulted in high praise, early job offers, and widespread interest in the *Primary Connections* program. Hackling (nd) has characterised this transition as a different "chain reaction": by increasing the PSTs' and classroom teachers' science pedagogical content knowledge, through using the *Primary Connections* materials, their science teaching practices improved, the students' opportunities for learning science increased and so did their science achievement.



From all perspectives this pilot science education program has been a great success and demonstrated the benefits of collaborative partnerships, not only for the BEd students, but equally for the school teachers and young students. As a result, RMIT University is keen to explore opportunities for creating new teaching and learning partnerships.

Enquiries regarding collaborative science education programs may be forwarded to the co-ordinator of the 2007 pilot, Jane Edwards: **jane.edwards@rmit.edu.au** while enquiries regarding opportunities in other areas of the curriculum should be directed to the Head of School, School of Education, Annette Gough: **annette.gough@rmit.edu.au**. Information regarding Primary Connections may be obtained from: **www.science.org.au/primaryconnections**.

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KEN LEITHWOOD

How to improve student learning, school cultures, accountability and standards

INTERVIEW BY JOHN GRAHAM

THIS IS THE second part of an interview with Kenneth Leithwood, Professor Educational Leadership and Policy at the Ontario Institute of Educational Studies at University of Toronto. It was conducted during his visit to Australia as a guest of the Victorian Educational Leadership Consortium (VELC) in conjunction with the Department of Education and Deakin University. He ran a number of workshops for VELC on distributed leadership, teacher emotional intelligence and parent engagement.

JG: What are the critical elements needed to improve student learning in a school?

KL: Our own recent research has been focussed directly on what contributes to the classroom. We are finding very strong evidence for what I would call "active instruction". This is instruction that acknowledges the constructive nature of student learning but places teachers in a very active role of stimulating learning, whether it is working with small groups of kids, individuals or the whole class. It seems to work best when teachers are extremely active, very attentive

to monitoring what's happening in that classroom. When they are quite prepared to provide direction and not prepared to allow time to be wasted in the classroom.

I suppose the second important variable that we see in research from other places as well as in our own research is what the literature is now calling "academic emphasis". That is an agreement in the school on the part of pretty much everybody — parents, students and the staff — that the academic work of the school is the first priority. Certainly one needs to acknowledge the social and emotional life of the kids in the school, but the main priority is kids learning the academic curriculum. From our own research it is the soft qualities in school that count the most.

JG: What do you mean by "soft qualities"?

KL: Well, a kind of shared commitment to the mission of the school across all of the staff, parents and students. The resources, the money, the buildings, the budget, those things only matter to the extent that they do things like allow people to stress the academic program of the school.

I think especially for kids who traditionally struggle at school, the engagement of the parents in that mission is especially important. I don't necessarily mean engagement by being in the school all of the time, but engagement in the work of the student especially in the home. For example, by creating expectations of success in school and in life and in creating expectations for occupations and careers that actually require education and being very supportive of the school's efforts.

JG: What has your research shown about the role of teachers in improving student learning?

KL: Some of my recent work has to do with teachers' sense of self advocacy, collectively and individually. This means a sense of confidence that even though we might not quite have it worked out yet, and not quite know how to do this the best way it can be done, we are confident that together we can figure it out. Advocacy produces persistence in learning how to do the things you don't know how to do now (but) which you are going to need to do. So, I would say advocacy is a big part of how we would expect improvement to accrue in a school.

JG: While you have already said something about this, I wonder if you could expand on your comments about the conditions which enable good teaching.

KL: I think that we have to acknowledge the role of the school culture as an enabler of good teaching. I often talk about the primary reason for wanting to develop a collaborative culture among staff in a school as being to increase the chances that everybody in the school will finally know how to do what each of us knows how to do well. What that means is creating structures that allow people to think, work and talk together with a clear

goal of trying to make things better.

That needs to be said because sometimes collaborative cultures can just reinforce what's already going on. But pressed toward improvement and with that as the goal, I think there is substantial evidence about the importance of collaborative cultures in the improvement of schools. It is talk and discussion and learning about how to do the job right in the context within which it can take place, and I would say creating that kind of cultural mutual work and learning is perhaps one of the most important conditions that can be created in the school.

In spite of all our talk about professional learning communities, collaboration is not the culture in many schools for all kinds of understandable reasons. People aren't finding the time to collaborate, people are being extraordinarily busy in their own classroom, in preparing for their own classroom and being inundated with paperwork and demands that take them away, not only from their own classroom, but from trying to build a more productive school.

JG: Have you seen how a school can move from an isolated culture to a more collaborative culture?

KL: Yes and it is not always easy. A collaborative culture is one of those things that gets created out of successful experiences in doing really important stuff together. So, where I see these kinds of cultures developing, is where the leadership and teachers at the school eventually agree that there is an important goal to be accomplished here with respect to students. It is a goal that they don't know how to accomplish terribly well, so they've got to use whatever means at their disposal to figure out how to do this. The most obvious means at their disposal are one another's brains. So in the course of truly grappling with these things they discover one another, in a sense, professionally.

Initially collaborating looks like more time wasted and time I can't devote to getting this lesson prepared. At some point you have to be convinced that this is time well spent and in the long run may even be time saved and you have got to experience that before you are convinced.

JG: Is there a link between student achievement and collaborative cultures?

KL: The trust that is developed in a school amongst teachers, parents and students is emerging in the research literature as a really important explanation for variations in student achievement. Collaboration and trust probably go hand in hand. As you begin to work closely with people, as you begin to realise how confident they are in some things, as you begin to treat one another in a sense where the other person's interests are not being violated and perhaps even being pressed forward, you gain a level of trust.

JG: Does the school leadership have a role in building the level of trust?

KL: You know what happens for leadership under these circumstances? Leaders often find themselves in the early days of tenure in the school really being pressed on every decision they make and people wanting to look over their shoulder at everything that they do. Basically, a lack of trust. Trust is what oils the machinery in an organisation, so when there is no trust there, the decision-making grinds along with everybody worried about it and looking over everybody else's shoulder. In a trusting school, and especially with the staff trusting the principal, you can let people do a lot more than when you don't trust them. They can get on with what they have to do and pay more attention to the hard things.

JG: Is there evidence that the increase in accountability measures and the use of standards (for both teachers and students) raise the learning outcomes for students?

KL: I wanted to go back to this because I have really spent a lot of time thinking about this issue and doing research about it, primarily in Canada. We tracked changes to accountability such as the introduction of teacher testing and we saw very little change afterwards in achievement. We collected data from principals and teachers who had this sense that people were looking over their shoulder even more than they had been before. They just didn't believe the government had the interests of kids at heart. They accused the government of just being political, *ie* pandering to particular sectors of the public.

I looked for evidence about the effects of increasing standards, for example on student achievement. That can take a variety of forms; it can be curriculum standards or it can be (in some American states for example) exit tests from secondary school when they graduate. It's a very mixed bag of data we have which tends to show little difference.

Most of these accountability polices are not reciprocal. That is, the person that is accountable belongs to groups at the lowest level of the hierarchal food chain. Of course their work depends entirely on the resources that are provided by people at the other end of the food chain and those people do not see themselves [as] accountable for providing the resources that are needed for accomplishing what they expect teachers to do. They will claim that they are being held accountable every four years to the electorate, but the people elect the politicians for all kinds of reasons that have nothing to do with what they have done at schools.

So, curiously enough, this is an agenda that has been advocated as an evidence-driven process to provide people with a basis for choosing schools. But this policy direction is not supported by evidence. Now, I do not think that means that we don't need to be accountable, but it wouldn't hurt to be evidence-driven about what the policy should look like.

JG: Can you describe some positive developments in accountability which are now happening in Canada?

KL: At the present time, in my own home province [Ontario], we are pursuing a set of policies that certainly have some heavy duty accountability attached to them. But at the same time there is a lot more support provided, more resources; in other words, the folks in government are holding themselves more accountable for providing additional resources to accomplish the additional outcomes they have in mind. That strikes me as having a better chance of success then simply being accountable in a one-way relationship which is happening in many American states.

The mantra of the policy makers is, "do more with less". Well, how does that work? If we thought schools were over-funded everywhere, we might see schools overfunded in the schools I visit. In fact they can sometimes be appalling places. I see some schools where they have to find tarpaulins to put over the computers when it's raining because the roof leaks so badly. That doesn't strike me as reciprocal accountability.

JG: The standards approach was introduced into Victoria in the 1990s, first of all for students and then for teachers. I am interested to hear you say that the level of evidence supporting these policies is very thin.

KL: The closer I get to these things the more problematic they become. What most people would like to accomplish is to raise curriculum knowledge and professional practice. They aren't actual standards, they are just categories of behaviour. In the case of leadership standards there is some evidence of the importance of those behaviours in successful leadership. The standards are too ambitious, and for the most part they act only as criteria for people to pay attention to, not standards as such. All that the emphasis on standards does, I think, is to standardise what everybody is thinking — and I don't see much virtue in that.

NEXT ISSUE
Leithwood on leadership, testing and the basics

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VIVIENNE WHITE IS the former national co-ordinator of the Australian National Schools Network and CEO of the Innovations Commission, and now leads the Big Picture Company of Australia and acts as a coach for the Australian National Schools Network. With more than 30 years' experience in education, research and policy-making, she is known for her innovative thinking, challenging perspectives and sound understanding of educational change and reform. Viv is committed to working closely with teachers and school communities to build collective knowledge about education practice. She believes that only through systematically sharing professional knowledge and practice will real improvement for students and their communities be possible.

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