XSEL VIRTUAL SELECTIVE HIGH SCHOOL PROVISION: DELIVERING ACADEMICALLY SELECTIVE SECONDARY CURRICULUM IN REGIONAL, RURAL AND REMOTE NSW

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2010 *xsel* cohort at their first residential school

ABSTRACT

This paper describes the development and implementation of the xsel program in Western NSW. The program supports identified high school students from regional, rural and remote communities to access the study of English, maths and science at an academically selective level. A program review was undertaken during 2012 using a structured questionaire to develop deeper understandings of the operational challenges, initial successes and potential improvements available to the program after three years of operation. The program review involved interviews with Principals, classroom teachers, students and parents of the program. The summative information from this process and initial planning documentation informs the content of this paper.

The xsel program is unique in that it applies a combination of on-line learning, distance education and traditional bricks and mortar schooling to meet the learning needs of a particular equity group; talented and gifted secondary students. The program has taken on one aspect of the geographic challenge of equitable access to educational opportunity and builds the capacity of rural educators to cooperate, collaborate and co-create and overcome the "tyranny of distance"(Blainey, 1966).

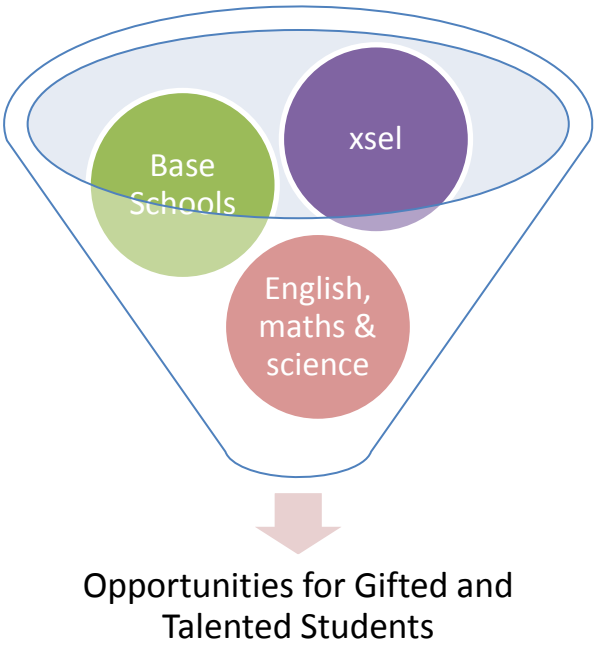
BACKGROUND

The challenges of distance and geography are well known to rural regional and remote Australians. These challenges are reflected in all aspects of engagement in 21st century life from business development to health and educational services. Our new challenges, as residents of rural NSW lie not only in geographical distance but in our capacity to collaborate, co-create and cooperate with each other for mutual benefit, shared vision and equity of opportunity.The development of the *xsel* program was announced in 2009 by the then NSW Minister for Education and Training the Honorable Verity Firth as part of the expansion of selective high school placements in NSW. As part of her announcement the Minister said: "The virtual selective high school initiative is particularly

exciting…Thirty new virtual places will be available, giving rural and regional students access to selective school level classes using advanced technology…"

The *xsel* program leverages synergies between bricks and mortar schools, a virtual provision and the core curriculum as indicated in Figure 1.

Figure 1: ***xsel Intersections***



The development of *xsel* was energised by the synergies created with the intersection of key Information and Communications Technology (ICT) program investments across NSW. Firstly, the NSW Connected Classroom Program saw the investment of $138 million in projects to upgrade network connectivity in all schools, installation of interactive whiteboards, desktop collaboration and video conferencing equipment. The program also delivered system wide learning tools, including a purpose built blogging interface. Secondly, the federally funded Digital Eduation Revolution (Department of Education, Employment and Workplace Relations), which has delivered in NSW Public Secondary Schools 1:1 computing for students in Years 9-12, integrated wireless networks, a comprehensive fully interoperable suite of program software and onsite technical support in all secondary sites. This investment meant the previously only imaginable quickly became not only possible but relatively, from a technical standpoint, simple. These projects meant the planning focus could remain pedagogical rather than be consumed by technical concerns.

In additon to these larger influences the region itself has invested heavily in teacher professional learning around the integration of information and communication technologies into quality teaching over the last seven years. Western NSW Region developed in 2006 *i*Teach21, a facility to support teacher professional learning and leadership capacity development in this vital area. *i*Teach 21 plays a pivotal role in ensuring regional teachers have access to high quality, ongoing, registered and accredited professional learning that positions them to feel confident to seek a teaching position with *xsel*. In concert these two programs have helped to build amongst Western NSW teachers and principals a culture and belief in ourselves as innovators and ready users of interactive technologies.

PROGRAM VISION

The *xsel* program is NSW's first virtual selective provision, designed to meet the learning needs of Western NSW Region's gifted and talented secondary students. Our vast region, the size of Germany, poses significant equity issues for our capable students wishing to access selective curriculum. The program is founded on the belief that our students do not need to leave our country towns, their friends and family and travel to the metropolitan areas to access a selective school. *xsel* is dedicated to using 21st century digital pedagogies to 'bring the school to the student'. Students in the program

hold 'dual citizenship', being both a member of the selective provision for English, maths and science delivered synchronously and asynchronously, whilst also being enrolled at their local secondary school and attending all other subjects in their base school.

Even a cursory examination of recent educational literature demonstrates that on-line learning is on the rise throughout the world, see Thompson 2010 "Beyond the Classroom Walls", and will be an influential indicator of success in the 21st century global economy. The *xsel* program has been informed by the growth nationally and internationally of on-line learning while at the same time strongly valuing the importance of a sense of place and a desire to ensure a continuation of the strengths of traditional curriculum delivery. As a consequence of this view, the *xsel* program strives to ensure a balance in delivery; about half of our students' curriculum is delivered on-line whilst the remainder is delivered in a traditional bricks and mortar context. The program vision is to foster a student who is not only at home in the digital world, but is empowered through their knowledge, skills and creativity to become an influential contributor to the knowledge economies of this century. The program is committed to creating opportunities that will build each student's capacity to become an autonomous, compassionate, life-long learner; one who values collaboration, creativity and who is connected to both the local and global community. Learning in this innovative environment has the potential to build a student's resilience, problem solving skills and to encourage students to be flexible and adaptable. Three years of operation has also demonstrated that the delivery of quality asynchronous learning materials also fosters student's independent learning skills, their ability to prioritise and manage time effectively.

xsel embraces the philosophy of 'personal best'. Whilst acknowledging that the job market and economy are based on competitive principles, we seek a more nurturing, holistic model for the development of our young gifted learners. Many students may have strong perfectionist traits, whilst others may have defined their success in earlier years by high rankings in their primary classes. We aim for our students to strive for their personal best as demonstrated by elite sportspeople and musicians. Rather than deriving their self-worth from 'beating another student' the program fosters our student's desire to beat their previous best and in doing so build life-long learning.

Finally, *xsel* embraces the development of the whole person. Our core business is the pursuit of an academic curriculum rich in higher order thinking. Many of our students have multiple gifts and passions across a variety of fields of endeavour, the program supports and values these pursuits. The flexibility, inherent in our virtual blended pedagogy, empowers students to take charge of their lives and their learning.

WHY A VIRTUAL PROVISION?

Across NSW Public Schools one of the most sought after models of education are the selective high schools. Each year around 13,000 Year 6 students sit the Selective High School placement test having made application to do so in Year 5. The applicants are competing for around 4,100 places in one of the seventeen fully selective high schools, one of the four Agricultural High Schools (three of these have boarding facilities) or placement in one of the selective stream classes operating in twenty five additional high schools. The majority of these options are only available in the metropolitan areas. Since 2010 the parents of the children of Western NSW have had access to a virtual placement via the *xsel* program, (from the NSW Department of Education and Communities website: http://www.schools.nsw.edu.au/gotoschool/types/selectiveschools.php)

Selective High Schools have been created to cater for highly achieving, academically gifted students. These schools seek to provide intellectual stimulation by grouping gifted and talented students together, concentrating resources and using specialised teaching methods.

Identification of Students:

> *"Year 7 entry into these schools is determined by the student's results in the Selective High School Placement Test in English (including reading and writing), mathematics and general ability, together with their primary school's assessment of their performance in English and mathematics. Other evidence of academic merit may also be*

considered. Entry into Years 8 to 12 is determined using criteria developed by each school's selection committee."

(From the NSW Department of Education and Communities website: http://www.schools.nsw.edu.au/gotoschool/types/selectiveschools.php)

The twenty five partially selective high schools have both selective and community classes.

Prior to 2010 the families and students of Western NSW, an area of some 385,000 square kilometres had no regionally based access to a selective high school placement. Parents could make application for placement at one of the three Agricultural High Schools that offer boarding facilities, they could relocate their family or make private boarding arrangements for their child if they achieved placement via the assessment process. This situation clearly demonstrated a lack of equity of opportunity.

As placement is based on the ideal of creating cohorts of similarly achieving students into groups, it was obvious that the re-creation of the existing bricks and mortar model in Western NSW Region would not achieve this end. Even the larger regional centres of Western NSW would not see a concentration of thirty academically gifted Year 7 students. The obvious conclusion was quickly reached, that even if this was feasible it would continue to deny equitable opportunity to children in smaller rural and remote communities. The challenge was and continues to be to ensure that all children, regardless of their physical location, have the opportunity to work with like peers.

Operationalising the concept

xsel, commenced in Western NSW Region in 2010. 2009 was devoted to planning the model, identifying and testing suitable technical equipment and products to support teaching and learning and the recruitment of staff. The executive positions and teaching staff were, and continue to be, selected on merit. The program has 2 full time non-school based staff who function as the Principal and executive officer and a full time clerical officer. Teachers delivering in the program are released for a proportion of their teaching allocation (0.4, equivalent to 2 days per week) by the Principal of their base school. The base school enters into a direct partnership with the *xsel* program. Our teachers design learning frameworks to make full use of digital technology, peer to peer networking, blogs, wikis, podcasts and vodcasts. In 2010 *xsel* had an enrolment of 30 Year 7 students. By 2015, *xsel* will enrol 180 students from Years 7 – 12. In 2013 we will have 120 students from around 32 regional schools in Years 7 – 10. This 21st Century learning environment is innovative in design and mode of operation, it provides high quality professional support to our teachers, our students and our parents as we work to expand and transform the secondary learning environment for regionally based talented and gifted students.

A detailed overview of the operational framework of *xsel* is provided as Appendix 1.

Research underpinning the Provision

The development and program leadership team who work directly in program delivery have used and reviewed a wide variety of research to underpin the development of the provision. The 5 Stage framework and e-learning principles of Salmon (2002), the e-learning pedagogy of Dabbagh (2005), coupled with Grappling's Technology Spectrum (1995) and the constructivist pedagogy of Le Cornu and Peters (2005) has helped shape teaching and learning. The gifted education research of Maker (1982), Gagne (2008), Gross, McLeod and Pretorius (2001), Betts and Neihart (2008) and Reis et al (1992) in addition to studies on learner centred classrooms Chandra Handa (2009) have informed staff and parents of the nature and needs of the student body. When Thomson (2010) published her seminal article "Beyond the Classroom Walls", the *xsel* teachers and leadership team were excited to read how Thompson's findings matched their own anecdotal understandings of *xsel*.

Ongoing challenges:

Results of the internal review and operational experience have identified four key ongoing implementation issues:

1. The scheduling of synchronous learning opportunities (Synops)

2. The role of the *xsel* Support Person in base schools
3. The challenges of being innovative
4. Teacher professional learning

These four areas of findings are best understood in light of the concept of 'layers of influence' that affect the innovation (Kirkland & Such, 2009). These findings may be disaggregated:

- Innovation- the factors associated with the approach itself;
- Micro level influences- innovator capacities and/or personal relationships (peers, students);
- Messo level influences- local influences- school cultures, school management structures and infrastructure, and community and authority impacts; and
- Macro level- government led initiatives, policy, curricula and wider research.

FINDINGS AND DISCUSSION FOLLOW USING THIS INTERPRETIVE FRAMING

Synops

The first finding is best situated in relation to the Messo level influences (Kirkland & Such, 2009). Ensuring the maintenance of the element of the program the learners find most critical gives our team its most time consuming challenge – synops, (Synchronous Learning Opportunities). Synops are approximately 25 minute intervals where teachers and students of their pod are connected via web conferencing for explicit and systematic teaching and learning. A pod is a working group of 10 students.

These virtual face to face instructional periods are scheduled without a direct imposition onto the base school timetable, a zero footprint model. This means common slots have to be found for each pod of 10 students across potentially 11 sites. To add complexity Broken Hill in the far west of NSW runs on South Australian time rather than Sydney Eastern Standard time – giving us a time zone difference of 30 minutes. Ensuring a functioning timetable that sees more than 32 schools intersect on a daily basis in a zero footprint model presents some unique challenges. In most schools the timetable drivers are unique to the individual setting – in this model we are asking school leaders and the timetabling team to share information well in advance to ensure *xsel* can run effectively, a new paradigm indeed!

Support Person

Using the Kirkland and Sutch (2009) levels framework to explain this finding is more complex - having elements relating to the Innovation level and to the Micro level as well, Kirkland and Such (2009). Ensuring strong welfare and pastoral support for *xsel* enrolled students in their base school environment, without capacity for financial support for the base school, is another significant challenge. Internal evaluations and surveys of student perceptions clearly demonstrate that the positive involvement of the *xsel* support person in the base school, with the *xsel* student and the program, is a critical success factor for our students. This is indicated in the literature. Xu and Jaggars (2011) noted that students enrolled in online and hybrid courses in State and Technical Colleges required student services, particularly technical support and reference librarian support. This study found that the *xsel* secondary students turned in the first instance to their base school teacher for a*ctivating* wrap-around services at the local level yet *related better* to their *xsel* teachers. Our efforts in this area are continuously being refined and improved however we have not been able to adequately address the financial issues associated. In essence we rely heavily on personal commitment by the teacher and the leadership capacity of the principal to ensure success. Communication and professional learning are the critical levers at our disposal.

Innovation and Potential Barriers

The Macro level influences impact heavily on innovations, acting to sponsor, ignore or deter innovative practices. Using any set of descriptors *xsel* as a program is deserving of the title innovative – a persistent challenge remains in fostering this innovation in what is essentially a large multi layered curriculum delivery organisation. The NSW Department of Education and Communities is responsible for in excess of 2,400 schools. The Department as a consequence has developed a number

of systems to ensure smooth operation and reliable service. While necessary, unintentionally, these very systems can make developing a small, responsive, unique system of educational delivery challenging. Managing: recruitment, performance, staff leave, student assessment, student attendance and welfare among other considerations, in a virtual environment present unique challenges and answers outside the standard system. To ensure success program leaders and sponsors invest heavily in promotion, awareness raising and negotiation around the provision. At times it can seem as though educational development time is overreached by these additional imperatives.

The challenges of innovation are not restricted to the system; they also impact on individual base schools. Accommodation for *xsel* students within base schools presents particular challenges. One of our partner schools in 2013 has 20 students across Years 7-10 involved in the program. These numbers mean that small seminar rooms, typically used as a learning space in most schools to host *xsel* students are inadequate and a classroom is required to meet needs. In a zero footprint model this raises new issues about school impact, funding, facilities improvement and so on.

These trends appear to be evident in the work of Kirkland and Sutch (2009). They report that social capital and the formal environment are crucial to the support or otherwise of the innovation. Tolley (2008: 5) had noted earlier that '*implementation strategies require delicate handling of all concerned, including administrators, teachers, parents and even pupils*'. Further, the interaction between school culture and leadership determines the degree to which (*xsel*) teachers are supported to take risks through a virtual delivery approach Howard and DeMeester, (2009).

In each setting Kirkland and Such, (2009) note two important and sequential factors impact innovations to which innovators must pay attention:

- The perception of an innovation can be crucial to its success; and
- This perception can be constructed from all layers of influence.

TEACHER PROFESSIONAL LEARNING

Both Micro and Messo level influences appear to be important in these findings. Teacher professional learning is pivotal to the success of *xsel*. As a provision rather than a school, the program receives no allocations for professional learning expenses tied specifically to the program. This means time for our staff to attend and develop their pedagogical skills as virtual teachers must be met in a variety of ways, while simultaneously providing mutual benefit to ensure ongoing commitment in the base school site. Teacher engagement, particularly in the initial years of operation, requires considerable investment in both time and money that must be found from new sources. While many virtual and on-line lesson delivery systems operate across Australia, and indeed internationally, finding available pedagogical experts who can assist us in this area has proved almost impossible. Technical support to operate the learning management system and the web conferencing tool has been far easier to access than support for pedagogical skills development and strengthening understanding of lesson design for an online environment. Instead, not unlike the well-known you tube video clip, we are building the plane as we fly it!

Moyle (2010, p.iii) notes that this problem '*pertains to what needs to be done to align the nature and structure of school with contemporary culture*'. As Moyle suggests the issue is not in getting teachers to use the technology but in using the affordances of technology '*in providing new, better, and more relevant learning experiences*' for which there is no precedence.

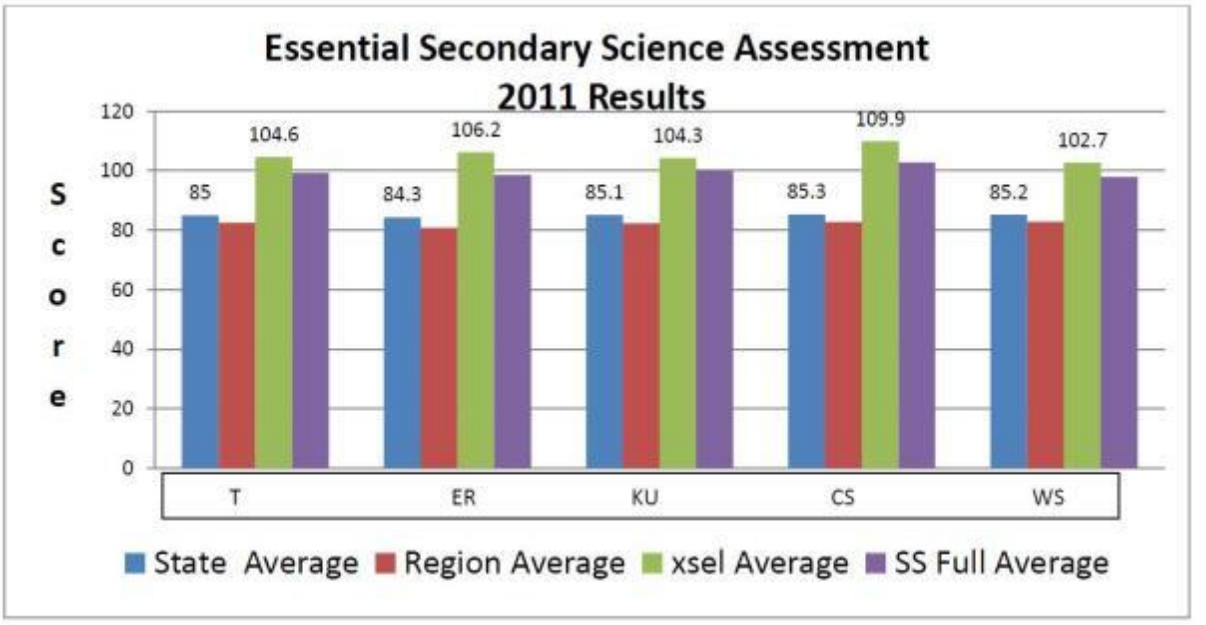
Teacher professional learning in *xsel* is critical to delivery. Recruiting teachers is an ongoing process as staff move into and out of the program. Our current staffing profile is a blend of early, mid and late career teachers. Interestingly later career teachers form the largest interest group. As Howard (unpublished) notes, teacher risk-taking is dependent on four factors: a strong sense of teaching-efficacy; computer-efficacy; playfulness and anxiety; and school culture. A virtual school provision with teachers and students drawn from base schools will be impacted by school culture. Our teacher professional learning is competency-based and supported by the leadership team. It is noted that it also needs to be social (Howard, op cit).

FINDINGS AND CONCLUSIONS

As the program is only in the third year of operation it is difficult to find reliable external data sources to validate the success of the program. The 2010 cohort of thirty students have now completed the Year 9 NAPLAN Assessment. This cohort have essentially undertaken three years of secondary education in English, Maths and Science, via the *xsel* program, so the 2012 data for matched students provides a key early indicator of student performance in the program. Growth rates are impressive comparative to like students and overall performance from Year 7 to Year 9 shows pleasing trends. It is not possible to provide comparative data regarding NAPLAN performance against other selective school enrolment due to data protocols.

Essential Secondary Science Assessment 2011 has also been completed by the initial cohort. The results graph in Figure 2 compares the average performance of the Year 9 *xsel* students against: the NSW Public Secondary Schools students' average performance, average performance of students in Western NSW Region, and the average performance of students in the seventeen fully selective high schools within NSW Department of Education and Communities. Comparisons are made against: T (total score), ER (Extended Response), KU (Knowledge and Understanding), CS (Communicating Scientifically) and WR (Writing Scientifically). The performance of the *xsel* cohort is pleasing and indicates learning in this modality can be successful.

Figure 2: ***Essential Secondary Science Assessment 2013 Results***



Student structured interviews reflect high levels of engagement and confidence in the program. They appear to be comfortable with the 'digital habitat' Wenger, White and Smith, (2009). The program as a whole suits some learning styles more effectively than others. Students who are very social learners often find the relative isolation challenging. Students place very high value on residential schools and indicate without the opportunity to meet face to face on a regular basis they would reconsider their involvement in the program. Students also report that they find some of the functionality provided through engagement using web conferencing tools advantageous to learning. In particular students mention the ability to ask the teacher "private" questions during a "synops" using a particular tool within the web conferencing software very useful. They report feeling confident and free to check their own understanding, because they do not have to reveal any confusion to their peers, as they would in a traditional classroom setting.

In addition students also recount feeling more connected with their *xsel* teachers than teachers in their base schools settings. During interviews they offered two explanations for this, firstly residential schools build a stronger connection because you are with your teachers in social and family settings way beyond normal classroom interactions and secondly the regularity and relative immediacy of

contact generated from emails, blogs and chat pages. Students deeply appreciate the personalised replies their *xsel* teachers provide to questions often outside of normal school hours.

Other evidence to support this experience can be gleaned from reviewing levels of student participation in external competitions. An overview of "Mathletics" and *xsel's* involvement in the 2012 competition is included as Appendix 2. Participant involvement and achievement levels in the competition are included as Appendix 3. To appropriately interpret this data it is important to note that student involvement was restricted to a maximum cohort of 90 students 30 in each year 7-9.

The presence of student voice in *xsel* can be seen to be on the rise. Moyle (2009) informatively reported on a national 'conversation' with students. In a personalised learning environment the teacher role changes and student power appears to increase. This is an area for further investigation and may yet contribute to the Office of Education's *High Expectations and Personalised Learning Priority and Discussion Paper* (DEC, 2011).

THE FUTURE

During 2013 we will be in a transition year to a new organisational structure that will see the disbandment of Western NSW Region as an organisation entity within the Department of Education and Communities. This will present us with new challenges. Consideration will need to be given to the current enrolment footprint of *xsel* as the existing boundaries disappear. In addition the staffing implications will need to be reviewed and opportunities for expanding the recruitment base of teachers considered.

2013 will also mark the year the program needs to complete planning for the transition into senior curriculum delivery as our first cohort begins Higher School Certificate study, the exit qualification for secondary school students in NSW. The curriculum in English, mathematics and science differentiates considerably in the final two years of schooling and catering for the array of subjects available is currently challenging the wisdom of our planning and leadership team. In addition thought needs to be given to what additional curriculum areas might be able to be added to the provision options.

The team remain committed to ensuring the learning needs of regional, rural and remote students in NSW Public schools are met and that students and families retain the option of participation in a selective education opportunity.

APPENDICES

Appendix 1

xsel Framework: How does it work?

- *xsel* students are fully enrolled at their local school. The local school enters into a partnership with *xsel* for the delivery of the selective school curriculum.
- *xsel* is responsible for the planning, teaching, assessment and reporting of the *xsel* English, Maths and Science curriculum to all *xsel* students.
- Partner schools are responsible for the planning, teaching assessment and reporting of the other subjects such as Geography, History, PE, Music etc.
- *xsel* reports formally twice each calendar year. *xsel* curriculum is organised in semesters. *xsel* reports directly to parents by the end of each Semester. *xsel* supplies partner schools with copies of the *xsel* reports.
- *xsel* and the partner school work collaboratively for the benefit of the *xsel* student. Partner schools and *xsel* always work to foster the student's sense of belonging to two schools (but one public system). Staff of local schools support and encourage *xsel* students.
- *xsel* partner schools appoint an *xsel* support person (xsp) who is the first point of contact and support for the *xsel* students in their local school.
- *xsel* partner schools undertake to support their *xsel* student with necessary resources, rooming and pastoral care.
- *xsel* timetables 'synchronous opportunities' (synops) for *xsel* students and teachers to connect via Adobe Connect. This is an 'opportunistic timetable' based on the *xsel* pods and *xsel* teachers.
- Rooming of *xsel* students is the responsibility of the *xsel* partner schools to ensure student safety and appropriate supervision.
- *xsel* partner Principals undertake to ensure that *xsel* students have the necessary opportunities to partake in the experimental work prescribed by *xsel* science teachers. A staffing allowance is provided to each local school to allow *xsel* students to be individually taught as a cohort for Science practicals. In this provision is the equivalent of one 50 minute period per week per *xsel* Year cohort at the local school.
- *xsel* liaises with partner schools in the lead up to annual presentation ceremonies, to ensure that *xsel* students are recognised for their *xsel* work at their local school presentation event.
- *xsel* has its own merit system and (via the *xsel* support person) integrates *xsel* students into each partner school merit or reward system. Many of these systems are cumulative and no *xsel* student should be disadvantaged in their local school by studying in *xsel*.
- *xsel* runs one residential school per term. These residential schools are held in the school week (usually a Wednesday/Thursday). *xsel* staff, in consultation with parents and partner schools arrange transport. Residential schools are held in Dubbo.
- Principals and *xsel* staff prefer that pods are formed across the Region rather than based on geographic proximity. Pods have approximately ten *xsel* students.
- *xsel* teachers do not teach 'face to face' any *xsel* students in their own school. All *xsel* teachers teach only *xsel* students at other schools.
- *xsel* fosters the notion of 'internally collaborative, externally competitive'. Student's work is judged against standards. However, *xsel* encourages all students to enter in a large range of competitions which give students excellent feedback compared to the state or nation.
- *xsel* Pods:

Each *xsel* year cohort of 30 students is divided into three pods of 10 students. Pods are determined by the *xsel* executive in consultation with *xsel* staff. In general terms:

1. *xsel* teachers are wholly responsible for the planning, teaching, assessment and reporting of the *xsel* selective English, maths and science curriculum to their pod of students.
2. Students will participate in their pod via a virtual classroom. *xsel* teaching and learning will primarily be via their laptops requiring a quiet space and connectivity (preferably Ethernet). The

web conferencing tool Adobe Connect is used to deliver "Synops" and the Learning Management System (LMS) Moodle is used for asynchronous learning opportunities.

3. No teacher will have students from their own school in their pod

Appendix 2

Extract from an xsel parent newsletter

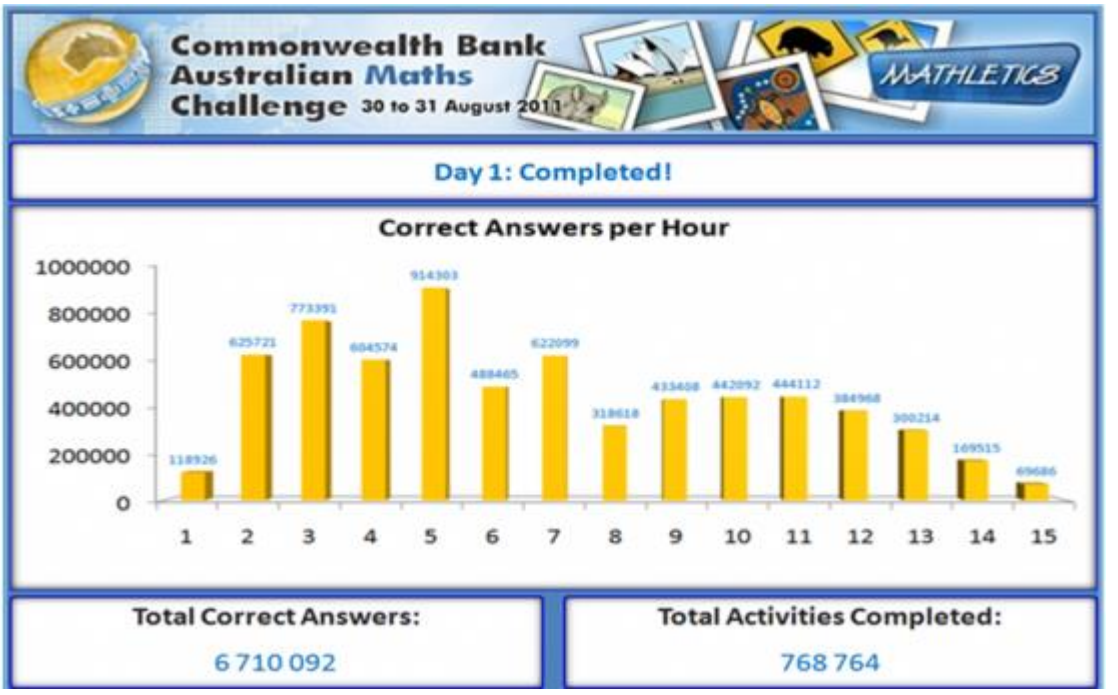
What is the Mathletics Challenge?
Mathletics is an online Mathematics program to which *xsel* subscribes. Mathletics conducted an Australia wide Mathematics challenge over two days. It was open to ALL schools in Australia. Schools who do not subscribe to Mathletics were invited to take part. 500 000 students across Australia participated.

Each day's Challenge ran from 8am – 11pm . Some *xsel* students participated for 10 plus hours on one or both of these challenge days.

Day 1: Students were required to answer previously unseen, Year appropriate, curriculum questions. This challenge covered nine topic areas across five mathematics strands: Data, Algebra, Measurement, Number and Geometry.

As we are only barely three quarters of the way through our school year, inevitably, there were topics presented to all students which have not yet been covered within their school courses. In order to achieve the best possible scores for the day, students needed to use the Mathletics HELP animations to teach themselves this new content. *xsel* students obviously managed this process particularly well, especially given the pressure of time on them to produce as many correct answers as possible during the day.

Students gained 10 points for every correct curriculum answer. The curriculum Challenge consisted of both Activities (one concept from the topic, with some support available) and Topic Tests which were a mixture of questions from all areas of the topic (without any support).Below is a graph generated by Mathletics which displayed overall, Australian data from the first day of the challenge.



Day 2: All Challenge contestants in Australia were pitted against each other in 60 second mental arithmetic playoffs.

When students clicked on "Find me a Game" they were presented with 3 opponents from any of the competing schools in Australia. The 4 students raced each other to complete as many mental arithmetic questions as they could in 1 minute. The progress of all students during the contest was shown in real time as a graph on each student's screen.

Our highest achieving students in the Challenge submitted approximately 20 000 correct answers each during this phase of the competition. What mathematical endurance!

Performance in the Maths Challenge

A particular School's performance was calculated by taking the average of all that school's, participating students', points.

Students and staff had access to the real time Hall of Fame which featured the 100 top ranked students and the 100 top ranked schools in state, secondary/primary and the whole of Australia, categories.

Appendix 3

Mathletics Overall Performance: (Mathletics website)

Commonwealth Bank Australian Maths Challenge Hall of Fame

Top 100 Students | Top 100 Classes | Top 100 Schools | State: All | Division: All

1	Heritage College Melbourne	12,056
2	Leumeah Public School	10,513
3	Bentley Park State College	8,708
4	St Peter's Catholic Primary	7,213
5	Resurrection Primary	6,899
6	Xsel	5,843
7	Terang College	5,816
8	Madeley Primary School	5,625
9	Robinvale P-12 College	5,091
10	Dunkeld Consolidated School	4,570

xsel achieved 2nd place in all NSW schools (all competing primary and secondary schools).

Commonwealth Bank Australian Maths Challenge Hall of Fame

Top 100 Students | Top 100 Classes | Top 100 Schools | State: All | Division: Secondary

1	Robinvale P-12 College	11,352
2	Xsel	5,843
3	Mercy Catholic College	3,236
4	Stromlo High School	3,201
5	Concord High School	3,113
6	Hamilton Secondary College	2,732
7	Good News Lutheran School	2,565
8	SCEGGS Darlinghurst	2,404
9	Grafton High School	2,383
10	Marist College	2,027

2nd place in all competing Australian secondary schools

Commonwealth Bank Australian Maths Challenge Hall of Fame

Top 100 Students | Top 100 Classes | Top 100 Schools | State: NSW | Division: All

1	Leumeah Public School	10,513
2	Xsel	5,843
3	St Patrick's College	3,781
4	Mercy Catholic College	3,236
5	Concord High School	3,113
6	Kooringal Public School	2,610
7	Redfield College	2,510
8	Carlton Public School	2,489
9	Grafton High School	2,383
10	Home Education Australia	2,303

And our VERY best result: We were placed 1st in all NSW secondary schools!

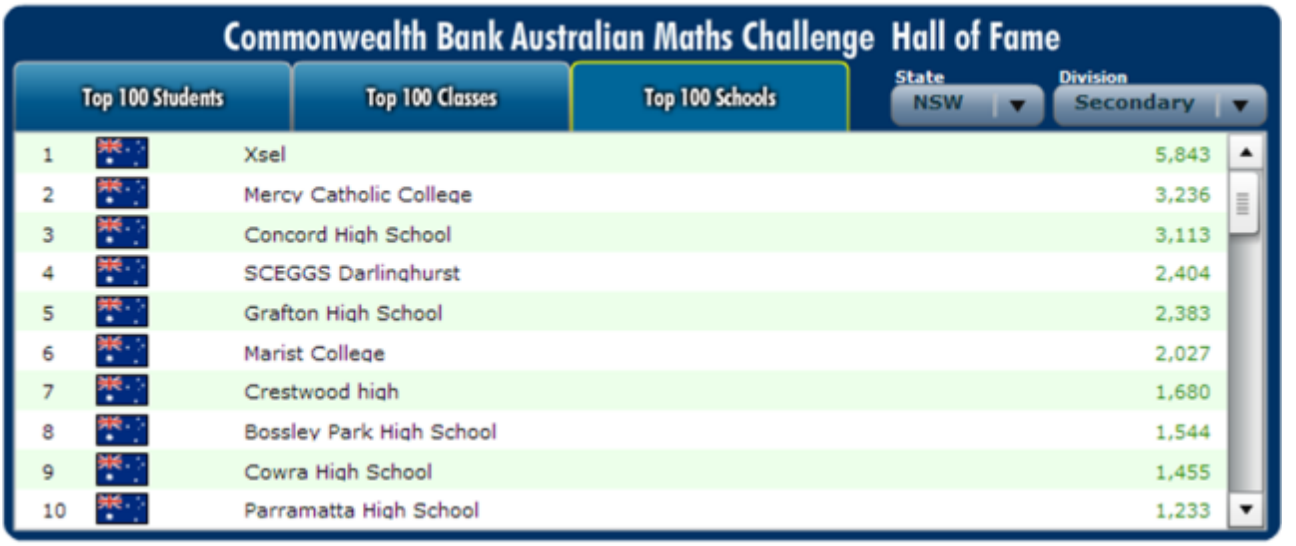


Table 1: ***Individual Student Participation results***

Category	**xsel Students**	**Position in top 100**
Hall of Fame Australia	Student A Student B Student C Student D	30 33 71 78
Hall of Fame Secondary Schools	Student A Student B Student C Student D Student E Student F Student G Student H	13 14 26 29 35 66 79 83
Hall of Fame NSW	Student A Student B Student C Student D Student E Student F Student G Student H	7 9 16 19 28 60 71 77

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