

THEME 21st century pedagogy

Technology changing teaching



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With constantly emerging technologies our world is also becoming more complex. With these changes and with the claim that today's students are different we also need to think about transformations in the way we teach. In Australia technology is playing a key role in how students play, learn, gain information and interact with others. Many students are already immersed in technologies and have preconceived ideas of what technologies they can expect to use in the classroom and how they will learn. Teachers frequently underestimate their students' ability to be perceptive about what works for them and what does not work (Smyth, 2007). In exploring how technologies can be most effectively integrated into classroom learning it is important also to realise that not all students have the same digital exposure to or skills with technologies. Although students may know how to use numerous technologies few know how to use the technologies effectively for their learning.

The Australian Government has recognised the importance of preparing students to live and work in a digital world through the introduction of a number of initiatives such as the Digital Education Revolution (DER) and the National Broadband Network.

From the research literature we know that digital technologies can impact on the learning experiences of students by increasing their motivation, engagement and encouraging creativity, collaboration and communication. However, it's not the tool that makes the difference to student learning but rather **how it is used**. Just using technologies in the classroom will not bring about changes in pedagogy nor will it make a poor teacher into an excellent teacher.

Digital technologies provide opportunities for students to learn in multiple ways in multiple spaces and are essential tools in today's world. The Web provides access to a wealth of information and increasingly more and more free educational programs. With the evolution of Web 2.0 the internet became more than an information resource but a communication and publishing media. Search engines are also moving from keyword and concept information identification to computational knowledge engines. Have you explored the power of Wolfram Alpha (www.wolframalpha.com)? It can calculate your algebra or calculus problem and scientific calculations as well as provide the working out. So if the computer can answer your questions and show how it is done, what are you going to teach? Don't panic, you won't lose your job but think about how this might change the what, and the way you teach? Despite the power of these new technologies, teachers are still the key to creating relevant and meaningful classroom experiences but we do need to think about how we are incorporating these digital technologies and the way we can enhance learning and engage students.

Further changes are occurring in the classroom, partly due to the DER and also due to the drop in prices of laptops and other personal devices. Depending on budget, schools are considering the

purchase of laptops or personal devices (iPad, netbook) rather than the purchase of interactive whiteboards (IWB). Don't get me wrong, interactive whiteboards still have their place, particularly where personal devices may not be appropriate, as they encourage analytical and critical discussion and assist understanding of complex concepts. There has been considerable research around the effective use of the IWB with recognition of its value in the classroom. A concern is that the IWB brings teachers out to the front of the room if teachers' pedagogy is not changed. However, there have been many positive benefits for teachers which include increased confidence and competence in the use of ICT, the sharing and reusing of material while also encouraging greater flexibility and spontaneity. From a student perspective some of the recognised advantages include potential for increased interaction and discussion, greater motivation and enjoyment, catering for different learning styles and maintaining greater 'on task' focus.

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Indigenous Education – not just dot painting



Christine Reid is the Indigenous Education Facilitator for Lutheran Schools Association (SA/NT/WA)

Wiki, Twitter, Google, Google+, Google Earth, YouTube, Facebook, Myspace, PowerPoint, blog, Photoshop, Movie Maker, widgets, Flickr, iPad, iPhone, Apple, SMART Boards, flip camera, computer, 3G, upload, download, network, online; are all words that are now a frequent part of the vocabulary of students in our schools.

In the 21st century 'being digital', through the use of Information Communication Technologies (ICT) is a powerful and effective way to engage students in learning. Indigenous students in Lutheran schools are reducing the gaps in literacy and numeracy through using digital technologies, which at the same time assists students to increase their knowledge in this important area.

Quality education leads to greater academic achievement, a more interesting school environment, improvement in attendance and greater self-esteem for the student. Educators must grab the students' attention, fire their imagination and hold their interest. Using digital technologies creatively and imaginatively is one way to do this.

Digital story projects improve literacy as well as ICT knowledge. Students create DVDs using *Movie Maker* and *Photo Story 3* (free to download). They take photos, movies, write stories about the images, make audio files, record each other and have fun while learning.

Stories about culture, families and familiar events are commonly made. *PowerPoint* books can be made, printed off and students have access to both a visual/audio book they can watch and listen to and a hard copy that they can read.

Setting up a *wiki* is a fast way to share videos, stories and photos with other students.

Facebook, Bebo, Myspace and *Pinterest* are all online communities where students can come together and learn. Events are shared through photographs and comments. Students are able to discover new tools before their educators through various social media platforms.

Websites such as *Mathletics* are fun interactive learning centres; students can advance their skills and have lots of fun in an interactive environment, sharing information with other schools.

Through *Google Maps* children can download map areas, add place names, photos and videos. Literacy, Mathematics, Geography are all part of the learning experience.

All schools have interactive whiteboards with computers and data projectors; an engaging interactive tool that can make learning fun and interesting. Gone are the days when project presentation was coloured card, textas and glued in photographs. Today the students can make an animated, multi-faceted presentation, using movies, audios, musical backgrounds; they can insert photographs, captions and search for information on the World Wide Web.

Blogs enable the students to write comments that can be added to by other bloggers. A discussion can be had with others, with ideas

and comments on topics being written down. Students from different schools can interact with each other. Students can keep a personal diary or share information.

IPads provide students with a tactile learning experience, from interactive *ibooks* to many apps that promote learning.

Crossways Lutheran School has been part of the Stride – Online Dreaming Project. Students prepare scripts, act in the film, film the acting and prepare the film for viewing. The project is aimed at 13-16 year olds and provides them with a chance to explore their creativity in multimedia. Short clips from the two films *Mystery Beach* and *Koonibba Netball* can be viewed at <http://www.stride.org.au/Online-Dreaming.aspx>

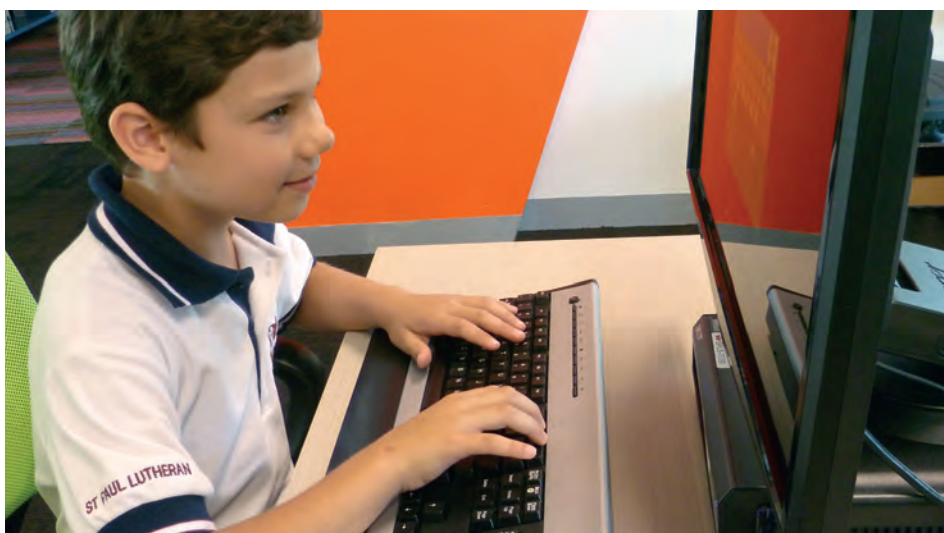
'It was so rewarding to watch the students' confidence grow and see how they began to problem solve during the process. It's certainly no easy task to make a film from scratch and to see the students' faces at the community showing and hear the reaction from the audience was just fantastic. They'd come so far' (Online Dreaming role model, Ceduna).

Yirara College and Living Waters College in Alice Springs were the winners of the Generation One – Hands Across Australia School Competition. Students sang, acted, recorded their singing and playing of musical instruments, and filmed the entry which can be viewed at <http://generationone.org.au/gallery> (open schools and competitions and navigate to page five).

The iPad app *Garageband* is a great way to interest students with a love of music. This app has been successfully used to reengage a student who was showing no interest in school and learning. His interest in music was harnessed and once using *Garageband* he was able to create his own music and have a focus for learning.

Twitter is a quick, easy way to provide small grabs of information to the Lutheran school community. The Indigenous Education Facilitator's Twitter address is @indigedlutheran and relevant news and events can be highlighted for *Twitter* followers.

The use of digital technologies to support the education of Indigenous students in Lutheran schools requires educators to put in place structures for success. The educational rewards are huge, watching students engage with learning in an environment that inspires creativity and promotes imagination. Indigenous students in Lutheran schools are bridging the educational gap with the additional aid of digital technologies.



Nathaniel Keeler, Year 2 - St Paul Lutheran School, Blair Athol

Agility in mind, technologies & environment

Enabling effective contemporary learning



Derek Bartels is the Lutheran Education Queensland Information and Communication Technologies Executive Officer

The advent of the knowledge and digital age is fuelling profound and escalating changes in global economies and societies. Advancements in brain science are providing insights into how people learn while also demonstrating that the minds of today's youth, the so-called digital generation, are being hard-wired to the digital landscape within which they live. At the same time, studies are confirming a crisis of disengagement of learners from traditional learning and teaching models. (Shifting Minds Report'- C21 Canada Summit)

Changing the art of teaching and learning to meet the demands and challenges of the

21st century requires agility in educators' minds, agile technologies and agile learning environments to enable contemporary learning practice. Whatever the model of 21st century literacies, all use ICT as a key enabler, inherent to each competency. We have all seen how the simple side injection of technologies into a learning community achieves very little gain in bringing value to learning and teaching. So educators with flexible mindsets, agile ubiquitous technologies working in rich agile learning environments, should form a scenario for 21st century learning.

Agility in mind

Continuous learning with clear purpose and connection to the real world is critical to developing the capabilities, dispositions and literacies required to live full lives in diverse communities and deal with issues and change in the twenty-first century. (MCEETYA)

Agile teachers are needed within today's learning culture. Rich engagement in technologies is also essential for graduating teachers. Tertiary institutions around Australia are addressing this need via the Teaching Teachers for the Future (TTF) federal government project.

Teaching Teachers for the Future will help embed ICT into everyday classroom learning by transforming the delivery of teacher education and supporting the development of progressive generations of teachers. Teachers who are expert in the use of ICT will assist universities to update teaching courses so that new teachers have the necessary skills to incorporate the use of ICT in classroom learning. (Education Services Australia)

One of the three goals of this project was to derive standards and elaborations in ICT for graduating teachers by the end of 2011.

FOCUS AREA	Descriptor	ICT Elaboration
3.1 Establish challenging learning goals	Set learning goals that provide achievable challenges for students of varying abilities and characteristics.	Demonstrate knowledge and understanding of how the use of digital resources and tools can support approaches to teaching that enable all students to pursue their individual curiosity, set their own educational goals, manage their own learning, choose the way they respond to tasks and challenges and assess their own progress.
3.2 Plan, structure and sequence learning programs	Plan lesson sequences using knowledge of student learning, content and effective teaching strategies.	Select and sequence digital resources and tools in ways that demonstrate knowledge and understanding of how these can support deep learning of the content of specific teaching areas and effective teaching strategies.
3.3 Use teaching strategies	Include a range of teaching strategies.	Demonstrate knowledge and understanding of how to support teaching strategies through the use of digital resources and tools in ways that facilitate accelerated and deep learning, promote creative and innovative thinking and inventiveness, engage students in exploring real world issues and solving authentic problems, promote student reflection and promote collaborative knowledge construction.
3.4 Select and use resources	Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning.	Demonstrate knowledge of the use of digital resources and tools to support students in locating, analysing, evaluating and processing information when engaged in learning.
3.5 Use effective classroom communication	Demonstrate a range of verbal and non-verbal communication strategies to support student engagement.	Use a range of digital resources and tools to support effective communication of relevant information and ideas, taking into account individual students' learning needs and backgrounds, the learning context, and teaching area content.
3.6 Evaluate and improve teaching programs	Demonstrate broad knowledge of strategies that can be used to evaluate teaching programs to improve student learning.	Demonstrate the capacity to assess the impact of digital resources and tools on students' engagement and learning when adapting and modifying teaching programs.
3.7 Engage parents/ carers in the educative process	Describe a broad range of strategies for involving parents/carers in the educative process.	Describe how digital resources and tools can support innovative ways of communicating and collaborating with parents/carers to engage them in their children's learning.

Table one: Standard three – plan for and implement effective teaching and learning



Traditional furniture replaced with bean bags - LEQ PD November 2011

The ICT standards for graduating teachers are:

1. know students and how they learn
2. know the content and how to teach it
3. plan for and implement effective teaching and learning
4. create and maintain supportive and safe learning environments
5. assess, provide feedback and report on student learning
6. engage in professional learning
7. engage professionally with colleagues, parents/carers and the community

Table one outlines Standard 3: *Plan for and implement effective teaching and learning*. These standards call on graduating teachers to be agile, bold and adaptable in facilitating contemporary learning and to leverage technology in rich ways beyond simple substitution. The elaborations may be challenging for experienced teachers also. For example, how would you rate yourself in performance for the following elaboration?

Demonstrate knowledge and understanding of how to support teaching strategies through the use of digital resources and tools in ways that facilitate accelerated and deep learning, promote creative and innovative thinking and inventiveness, engage students in exploring real world issues and solving authentic problems, promote student reflection and promote collaborative knowledge construction.

Agile technologies

Agility in technologies can only be achieved when synchronised with the other two facets of agility discussed in this article; however, the type and use of technologies do play an important part. We must strive for meaningful ubiquitous use of technologies in learning; flexible learning spaces coupled with educators' flexible engagement can only have success with agile technologies. Rigid computer laboratories with rows of desktop computers will not provide agility. The use of mobile and portable devices such as tablet shaped single form factor technologies will help in transforming traditional classrooms into agile ones when used appropriately. Many Lutheran schools are implementing devices such as tablet pcs, iPads and slate technologies. Where possible these implementations are striving for a personalised solution; that is, each student is allocated a device for use on and off campus.

Such devices are proven to scaffold success in contemporary learning environments due to their long battery life, instant on and very little technical support, thereby minimising 'time to task' and maximising 'time on task' for the learner.

If we are to see real gains in student learning and technology, there must be a change in process. Technology is not enough if we continue to do the same things with it that

we did before technology. We need to rethink how we go about teaching and learning so that computers do not become the \$1000 pencil. (Alan November)

The key ingredient here is always the teachers who are acting as masterful learners or facilitators of learning. How do they engage with the technology and learner in rich meaningful ways? Where are they on the adoption model (see figure one) when using new technologies to enhance learning? Are they at an entry level or at an invention stage?

A key question teachers also need to ask is how they are using these agile technological devices in learning. Looking at the SAMR model (see figure two), is the technology solely being used in an enhancement mode or in a richer transformational mode? Key questions which need to be answered in order to achieve results.

Agile learning environments

The classroom is a relic, left over from the Industrial Revolution, which required a large workforce with very basic skills. Classroom-based education lags far behind when measured against its ability to deliver the creative and agile workforce that the 21st century demands. This is already evidenced by our nation's shortage of high-tech and other skilled workers - a trend that is projected to grow in coming years. (Prakash Nair)

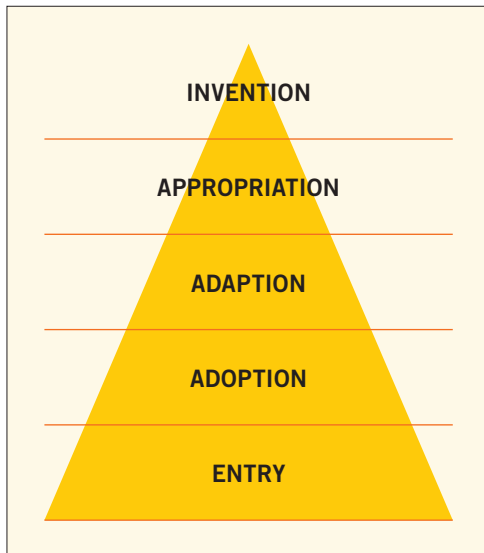


Figure 1: Levels of Adoption model

Without an agile learning environment, meaningful ubiquitous use of technologies in learning via educators' flexible engagement cannot be achieved. The classroom or physical learning space is being challenged with more appropriate designs. Professor Stephen Heppell, in his recent visit and work with Lutheran schools in Queensland, argued for a radical change and implements what he preaches. He promotes students having a say in the design of their learning environments on the school campus. *'Kids + Technology + a*

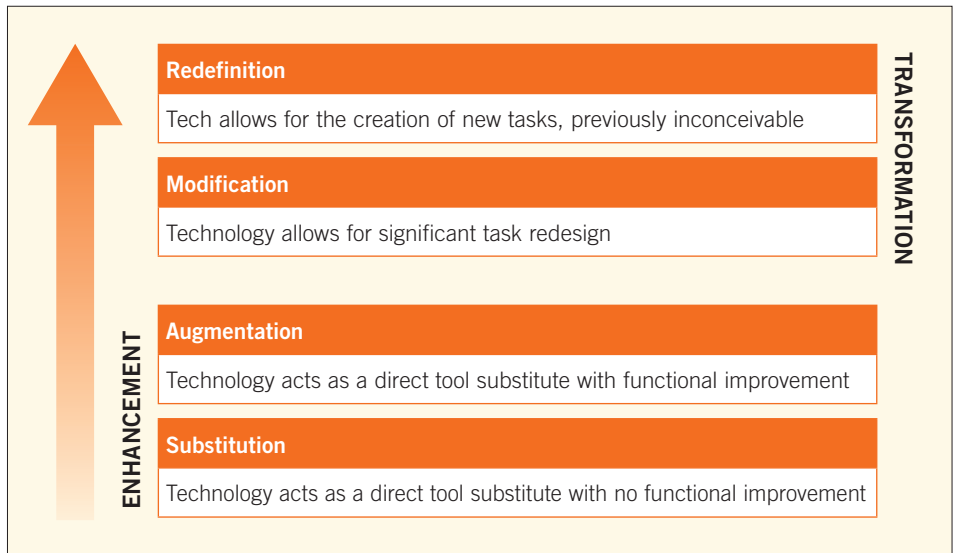


Figure 2: SAMR – Models for Enhancing Technology Integration

Voice = Stellar Progress... Our vision for kids is massively underwhelming. We are holding them captive in a prison of criteria' (Stephen Heppell).

He promotes learning spaces that celebrate children and embody community, mutuality and belonging. His radical yet very successful designs around the world are not about spending loads of money, simply about thinking differently and deciding what's important for learning today. Café style learning, stairwells as lecture theatres, shoes off learning and factories and malls turned into

schools are some of the ideas for successful learning environments.

Recently at a Lutheran teachers professional development day in Queensland, the traditional furniture was replaced with bean bags and soft flexible furniture. This was based on Heppell's premise that if you are learning to use agile technologies why not use them in an agile learning space? When we go home and read a traditional novel or browse information on an iPad, we do not find the straightest chair at a rigid table and sit upright to carry out this task, so why should we in a learning space?

His rule of **three** for 3rd millennium spaces includes:

- » Never more than **three** walls
- » No fewer than **three** points of focus
- » Always able to accommodate **three** teachers and **three** classes

Conclusion

As educators and leaders in Lutheran schools, we need to continue to implement bold not old paradigms of technology integration which are rich and meaningful for our learners. As Will Richardson states, *'we need to create student-centred, inquiry-based, technology-rich learning opportunities in our classrooms that can help kids navigate the world they live in'.*

Lutheran education is well positioned to take up the challenge to grow and develop flexible and agile teachers performing as masterful learners engaging with technologies in rich and meaningful ways within supportive dynamic and agile environments.



When we go home and read a novel we do not find the straightest chair and sit upright... so why should we in a learning space?

Technology in 21st century pedagogy



Cheryl Fillmore is Dean of Teaching and Learning at Immanuel Lutheran College on the Sunshine Coast in Queensland

Preparing students for life in the 21st century is a challenge for schools and teachers. We are told that the jobs our students will engage with have not yet been invented; that they will change jobs repeatedly and that they will need to be lifelong learners who are adaptable and flexible. Our *digital native* students integrate the use of technology into all aspects of their lives and take for granted that web-based platforms provide instant 24/7 access to data, entertainment and friends. Is the use of technology the key to education for the new century?

How should our curriculum and pedagogy reflect the changing needs of 21st century learners? Educators have limited flexibility with curriculum as it is still largely dictated by the requirements of university entrance and is set within a regime of high-stakes testing and public reporting of a narrow band of educational outcomes. In contrast, opportunities for innovation in pedagogy abound and include the potential to harness the vast array of digital tools available for 21st century learning.

While I am a big fan of digital tools, it is important to remember that research shows that it is excellence in pedagogy rather than the digital tools per se that are critical for learning. Hattie (2003) in his meta-analysis of the major sources of variance in students' achievement (see Figure 1), found that, after *students' innate abilities*, something over which teachers

have little control, the next most critical factor (about 30%) relates directly to what teachers know, do and care about. Hattie goes on to say that the three most powerful aspects of pedagogy were *Feedback, Instructional Quality and Direct Instruction* (effect sizes of 1.13, 1.00 and 0.82 respectively). By contrast, *Simulation and Games, Computer-assisted Instruction, and Audio-visual Aids* alone for example were far less effective (effect sizes of 0.34, 0.31 and 0.016 respectively). This sounds distinctly *old school!*

It seems that expert teaching will be as important in the 21st century as it has always been. Hattie found that the students of *expert teachers* demonstrated

an understanding of the concepts targeted in instruction that is more integrated, more coherent, and at a higher level of abstraction than the understanding achieved by other students. (Hattie, 2003, p. 15)

Such deep conceptual learning must better prepare 21st century learners for success in an uncertain future where *far transfer* of learning to novel situations will be required.

Immanuel Lutheran College has a history of fostering expert teaching and innovative, technology-based pedagogy to promote far transfer of learning. Immanuel teachers have received national and international recognition in the form of grants, scholarships and awards for their work. Examples include: a Texas Instruments scholarship (for the use of graphics calculators in Mathematics (Fillmore, 2005); a Microsoft Innovative Teacher Award and the Professional Educator magazine article for the Pocket PC Project (Fillmore, Flegg, Muller, Hawkins, & Cakacaka, 2005); a \$150,000 Hewlett Packard Innovations

in Education grant for work with tablet PCs (Bond, 2010); and the then Head of Science, received a Highly Commended Award as runner-up in the Prime Minister's Prize for Excellence in Secondary Science Teaching.

A major refurbishment of Immanuel's science centre in 2011 created 21st century learning spaces designed to support one major technology-based pedagogical innovation: the Tablet/Workbook Pedagogy (TWP). This is based on my Master's research. I used Cognitive Load Theory (CLT) (Sweller, van Merriënboer, & Paas, 1998) to understand why students find subjects like Physics, Chemistry and Mathematics so difficult. I then applied CLT principles to design the TWP which harnesses the capabilities of tablet PC technology and showed that significantly improved learning outcomes in far transfer tasks for Year 11 and 12 Physics students.

CLT is constructivist in nature suggesting that learning occurs when learners are actively involved in the construction and reorganisation of concepts (von Glaserfeld, 2005). It is based on several widely accepted ideas about the learning process represented in Figure 2. Human cognitive architecture includes a severely limited working memory (Atkinson & Shiffrin, 1968; Baddeley, 1999) which can handle simultaneously only around seven items of simple information (Miller, 1956) or around four items of a more complex or novel nature (Cowan, 2001). Its processing capacity can be expanded by directing complementary information via its two channels, audio and visual (Kalyuga, Chandler, & Sweller, 1999). In contrast, long term memory is virtually unlimited and stores related information in chunks called *schemas* (Bannert, 2002). Learning occurs via the process of schema

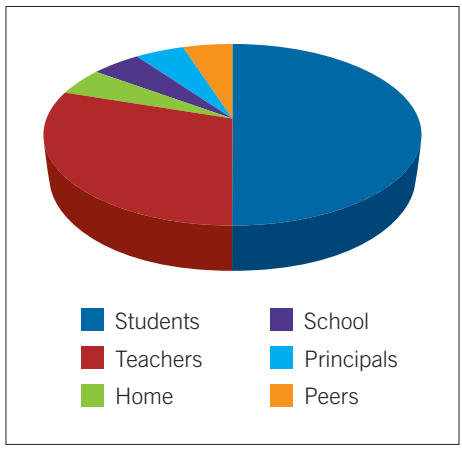


Figure 1: Factors affecting variance in student achievement (Hattie, 2003)

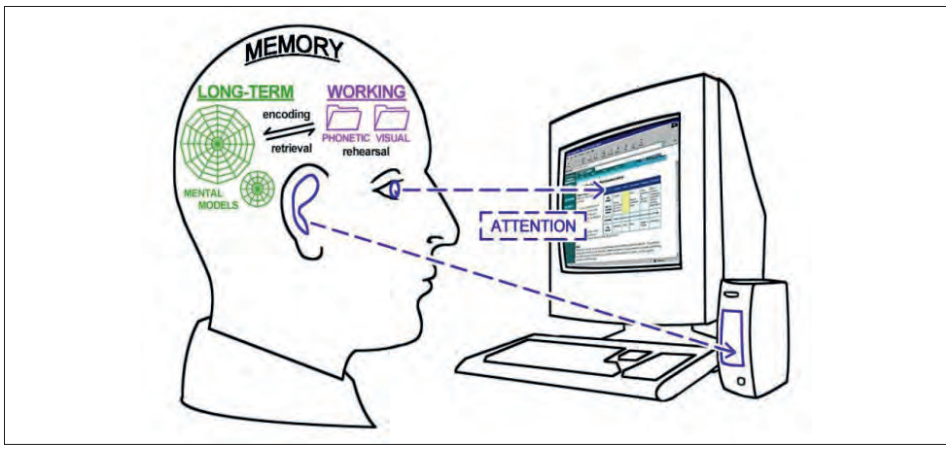


Figure 2: The Learning Process (Clark, Nguyen, & Sweller, 2006)

construction and automation as the working memory integrates new knowledge and concepts with old by retrieving existing schemas and expanding them before encoding them back to long term memory.

Unfortunately, the limitations of working memory frequently affect learning outcomes. Processing instructional information causes *cognitive load* in working memory which can soon become *cognitive overload* when demands on working memory exceed its limited capacity. Cognitive overload restricts learning and so must be avoided.

CLT provides practical, evidence-based instructional guidelines for effectively managing cognitive load. It identifies three different types of cognitive loads (see Figure 3).

Intrinsic cognitive load refers to the mental work imposed by the nature of the material

to be learned and is consequently difficult to control. It is perceived differently by novices and experts and is related to the material's *element interactivity*. Learning materials with low element interactivity can be processed serially through working memory, limiting the cognitive load imposed (see Figure 4). However, learning materials with high element interactivity require the simultaneous processing of multiple elements in working memory, frequently causing cognitive overload (see Figure 5). Subjects perceived as difficult such as Physics (Smithers & Robinson, 2006) frequently involve engagement with high element interactivity learning materials.

Extraneous cognitive load results from poor instructional techniques that impose cognitive loads on working memory that are not necessary for learning. CLT identifies sources of extraneous cognitive load and suggests

ways to improve instructional design to reduce these loads (see Figure 6).

Germane cognitive load occurs when the learner's attention is directed to engage in cognitive activities that benefit learning (see Figure 7). It is paradoxical that an increase in this cognitive load can be beneficial (the *Transfer Paradox*) (van Merriënboer, Schuurman, de Croock, & Paas, 2002).

A selection of CLT recommendations are embedded in the TWP and enabled by the use of tablet PC technology. Figure 8 provides an overview of the TWP in contrast to traditional pedagogy for teaching secondary school Physics. For example, use of the tablet PC allows the reduction of split attention and search (extraneous cognitive loads) and an increased ability to direct students' attention (germane cognitive load). Frequent use of

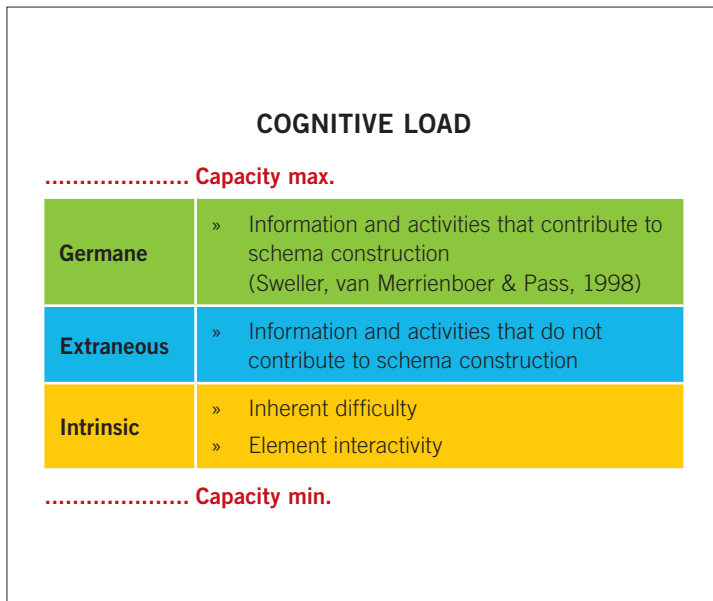


Figure 3: Types of Cognitive Load (Paas & Kalyuga, 2005)

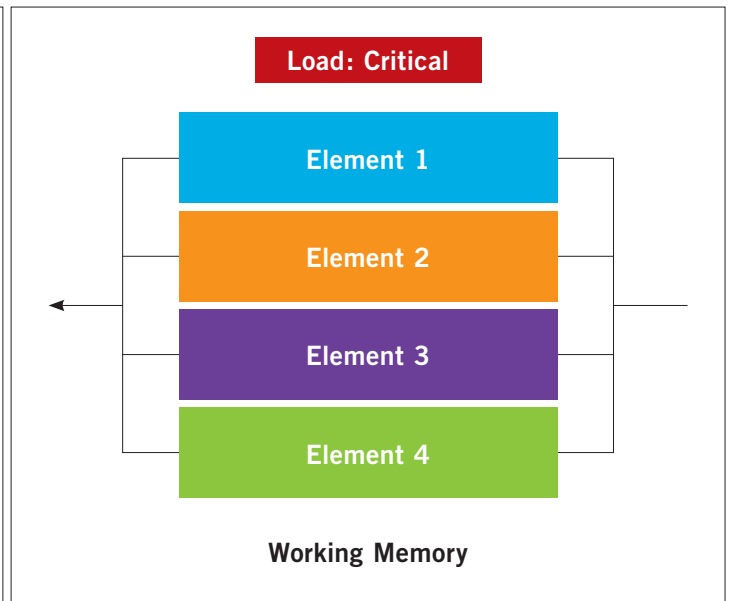


Figure 5: High element interactivity

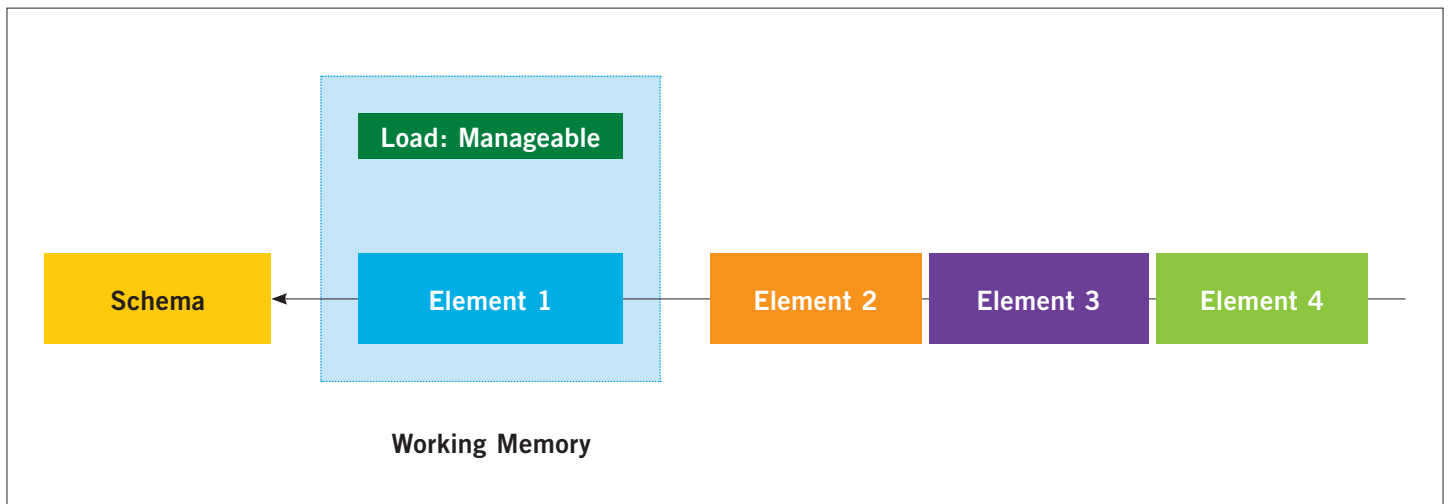


Figure 4: Low element interactivity

diagrams, images, movies and animations exploits the dual channel processing capability of working memory to avoid cognitive overload. Extensive use of faded and variable worked examples also increases germane cognitive load in a controlled manner. Full details can be found in my thesis (Fillmore, 2009).

The TWP was trialed with several cohorts of Year 11 and 12 Physics students while control groups continued with traditional pedagogy. Introduction of the TWP was timed for different stages of the course with each cohort. Improvements in far transfer performance were linked (at 5% level) to the introduction of the TWP. No improvements in far transfer performance were attained in the control groups learning with traditional pedagogy. In surveys, students linked improvements in their learning to CLT design elements incorporated in the design of the TWP (Fillmore, 2009).

Such improvements in far transfer are exactly what is needed for 21st century learning. The TWP research provides a powerful example of what can be achieved when new pedagogy harnesses both good learning theory and a suitable technology. At Immanuel, we believe that curriculum and pedagogy must drive decisions about the selection and embedding of specific digital hardware and software. For this reason, we are taking a multi-modal approach to ICT integration rather than adopting a one-to-one model with a laptop or iPad program. No single device can yet satisfy the needs of all subjects or all pedagogies. To ensure that our teachers and students have access to 'the best tool' for a specific desired learning outcome, we have opted for having multiple class sets of various devices including tablet PCs, iPads, laptops and desktops. We also harness student owned devices by allowing the use of smart

phones, iPods etc. as appropriate. This allows us considerable flexibility and enhances adaptability in preparation for the challenges of life in the 21st century.

Over the past decade Cheryl Fillmore has received national and international recognition for her work in embedding technology into pedagogy in her Physics and Mathematics teaching.

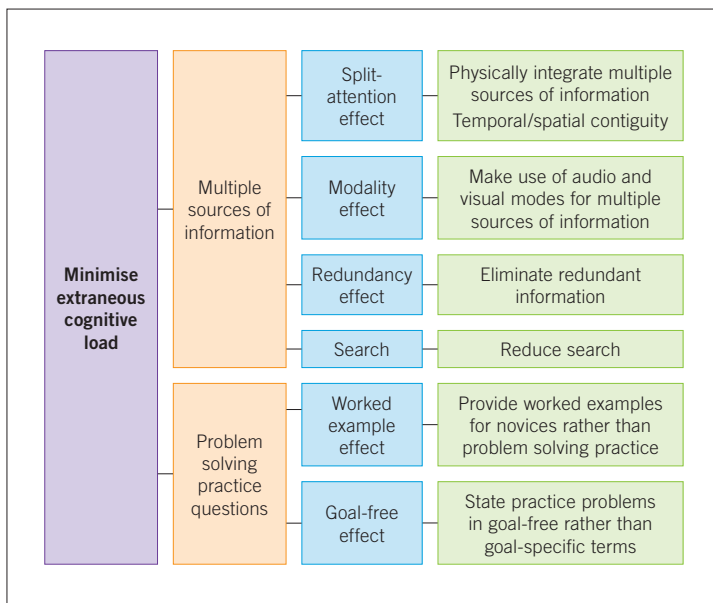


Figure 6: Ways to reduce extraneous cognitive load

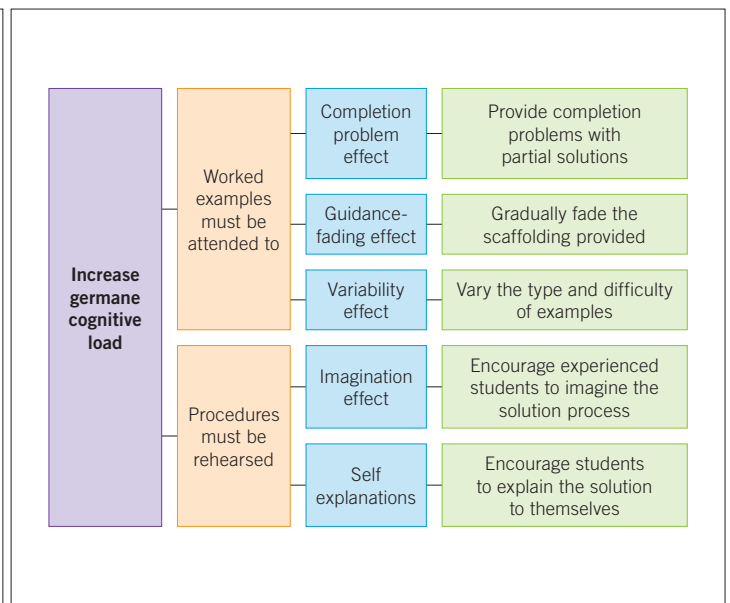


Figure 7: Ways to increase germane cognitive load

Traditional Pedagogy	Tablet/Workbook Pedagogy (based on CLT)
Students record and organise their own notes during lessons	Teacher provides <i>guided notes</i> in a workbook. These provide a structured but deliberately incomplete record of the information, diagrams and images for the lesson (Heward, 2003). Teacher uses the tablet PC with an electronic version of the workbook to provide a shared representation and to direct students' attention Lesson develops through dynamic teacher/class interactions and includes the frequent use of digital resources eg animations embedded in the electronic document. Teacher annotates the electronic workbook with digital ink while students annotate their hard copy of the workbook.
Students practice solving problems Answers available	Students complete numerous faded worked examples in class Fully worked and clearly explained solutions to all problems are available online

Figure 8: Essential elements of traditional pedagogy and Tablet/Workbook Pedagogy

Regional news: Lutheran Schools Association (SA/NT/WA)

Learning with technology - some old challenges & some we've never faced before

It would be a rare visit to any school for the conversation not to drift to how students are using computer technology in their learning. Arguably, the most evident emerging trend in our schools today is toward every student having their own device. This is not just evident in the year levels that the Digital Education Revolution has funded the device; we are seeing the emergence of one to one technologies and their use across all year levels – even by the youngest students in our schools.

Learning with technology in a computer rich school has amazing possibilities. A visit to any school that does it well is inspiring, with engaged students using the abundance of technology available to them to learn and achieve in ways that would seem miraculous to students of the past. What fantastic opportunity we have.

But it would be misleading to suggest that we are in utopia and there aren't challenges – especially in one to one environments where computers are on tap 24 hours of every day. Some are old challenges and some we have never faced before. Four challenges worthy of closer examination are equity of access, a new teaching and learning paradigm, rethinking teacher professional learning and developing e-safe learning environments.

Equity

An immediate consideration for any school considering a one to one computer strategy is sustainability – and with that comes the issue of equity.

We are already in the round 2 phase of the Digital Education Revolution (DER). This

means only a relatively small percentage of the initial government funds is now available to schools to continue the programs initiated under the DER. For many schools, perhaps all, the funding of a one to one device for every student is simply not possible. Schools with students in the primary years have never had the luxury of government funded computers. One response to this is to shift the direct funding of the device to parents and many schools are currently doing this.

As we all consider new models of funding for computers inevitably the discussion turns to another emerging trend in computer technology – bring your own device (BYOD). While how we technically manage BYO devices is an issue, there are relatively easy technology solutions. However, I firmly believe there are bigger conversations to be had around BYOD and one of these is about equity.

This is a very real challenge for schools that need to ensure that the choice of the device by parents and students doesn't accidentally determine the learning opportunity and outcome. Is a smart-phone an equal device to a laptop for creating a graphic and word rich document for traditional assessment? Of course not. The smart-phone has amazing potential to enrich learning but it is within a specific context and use. It seems an extreme example but we do have global examples of where schools allow such diversity of device. What can we do to ensure equity in a BYOD environment?

Many would contend that it is simplistic and naive to consider only BYOD as a strategy for shifting cost.

Innovative pedagogies

Simply put, the smart-phone, the laptop, the tablet and all others can bring equal benefit in school environments that have reshaped and redefined their curriculum, pedagogy and learning models.

Whether the term we use is *21st century learning* or *innovative pedagogies* or *inquiry based learning* or some other, they all recognise that the classroom of today should not be that of the past. The students of today are not the students of the past. Students in 2012 exist in a world that is live and powered up; ready access to social networks, search engines and web information and data is the norm.

Schools that successfully integrate technology and learning do not achieve their outcomes serendipitously. The evident pedagogy of the school matches to the students and the learning environment. There is a holistic approach that brings it all together. In these environments the device complements the learning model. A smart-phone can bring the same return to an inquiry as a laptop in an environment where the question is key and the outcome is not specifically defined. In fact, a smart-phone may even be a better device to make a video of your evidence of learning.

Some would describe this new learning environment as student-centric – rather than the more traditional teacher-centric classroom. It implies that students have choice, define the investigation and learn wherever and whenever. There is also choice when it comes to the presentation of the proof of learning for assessment which may no longer be yet another essay or report.

In an innovative, student-centric learning environment it is possible for a bring your own device model to also bring equity – but there is a significant challenge for schools and teachers emerging.

Professional learning

As our classrooms shift from teacher with all the knowledge to teacher and student as learner, the role of the teacher changes dramatically. That burned-in image of a successful classroom, with teacher out front of eager students with hands raised begging to answer the latest probing question, is changing. We might now re-image that to anywhere/anytime learning spaces with groups





of students gathered around and enabled by mobile computers of many different forms; enabled also by a brilliant teacher-facilitator who guides and learns and adapts and encourages learners to go to places never thought possible.

If we are ever to reap the outcomes we would hope for from the investment in devices in our schools we clearly need to recognise the teacher as key to it all.

But that presents many more challenges. How do we fund the level of professional learning required? How do we re-train what is recognised as an ageing workforce? What do we do with teachers who are good at what they do but just don't know how to use computers? What is the best form of professional learning to undertake when it seems the traditional day out from the classroom is no longer bringing benefit?

These are not questions that can be answered here but we do know that professional learning is changing – and has to. Emerging trends in other workplaces would suggest that we need to consider how we facilitate more peer to peer learning amongst teachers; more collaborative, pedagogical conversations; more observation of how we each teach and learn and more time to simply talk about how to use computers well.

The iPad has given us a micro-view of one possibility. The *there's an app for that* discussions that take place at cafes, airports and after the business of a meeting are often, as one principal recently expressed it,

where we learn. How do we create those same types of learning environments for teachers? Environments where teachers informally gather to share a coffee and ideas – like those of the Parisian street cafes of the past where good ideas came from. Environments that encourage teachers to debate their craft. Environments that are collaborative and continuous.

Maybe we just need to provide cheese and great coffee. Maybe we need to provide the device to our teachers. Maybe it's about making a meeting less administration focused and giving over the time to real conversations and sharing. If we can make it happen for teachers, we have some hope of enabling great learning in one to one and BYOD environments.

Safe and responsible

As the device shifts from locked down on our premises to mobile, one to one and 24/7, we find ourselves losing control. Worse, we now have personal mobile devices sharing phone network based internet services to many other devices – none of which the school can manage. Whether we like it or not, we are not able to offer a technical or policy-based solution that has credibility. The head in sand approach is to legislate and police harder. However, the reality is that one to one devices are not the only devices students own and use and we are increasingly falling behind if our goal is simply to control the masses.

This is a very real challenge – but doing the same things that we have done previously,

more diligently, is unlikely to have any different result.

We talk education in these situations but often find it hard to make real education happen. Yet we know the most effective tools we have are the education of students, parents and teachers AND the school code. As Lutheran schools we expect our code to be strong. We have energetically shaped this in our learning communities over many years. As we approach the challenge of internet-enabled one to one learning have we had the same energy for the education associated with the safe and responsible use of internet based tools and services? Do parents know their rights, responsibilities and strategies for managing devices at home? Do students know theirs? Teachers? Can we clearly define where the learning is happening to ensure our virtual spaces are safe and responsible for all?

The above are just a few of the challenges emerging around more devices and one to one in particular – there are of course more. Despite all this, in LSA schools and in fact all Lutheran schools, kindergartens and centres there are amazing opportunities for learning and now we need to move forward. We also know that for schools to be successful in this new age of learning they will need to be bold, intentional and absolutely learning focused. We can all do that...

Rod Wearn

ICT Consultant

Lutheran Schools Association SA/NT/WA

Regional news: Lutheran Education South Eastern Region

Learning Support at Victory Lutheran College

In addition to the CoW (Computers on Wheels) program at Victory Lutheran College, which makes laptops mobile throughout the college, the Learning Support Team has started using iPads with students who need additional learning support.

The iPads have proven useful in engaging students with learning needs, enabling them to be more tactile in their learning and to use a range of apps in the classroom setting. Writing, spelling and maths apps are among the most common, with learning games used as rewards for work completed within the mainstream classroom context.

Students have found a new way of engaging with the iPads and their learning, enriching their experiences at school and allowing them to achieve in new areas that had previously been challenging for them. The college is looking at expanding the program to allow more students to take part in it. While the

college owns the iPads some parents have seen the benefit for their child's learning and purchased their own iPad to free up the school resources for more students.

Cain McDonald

Principal
Victory Lutheran College
Wodonga, Vic

Brave bloggers!

This year, year two staff and students at Trinity Lutheran College Mildura embarked upon a new and exciting journey. Each year two class now has a classroom blog to share their learning and to extend their current knowledge. The teachers are no technology whizzes, but have had to teach themselves and each other how to build, navigate and nurture an effective classroom blog. Making learning authentic can sometimes be difficult, finding ways to motivate some students can be challenging and integrating technology into the curriculum can be tiring. All of the content is relevant to their learning and has featured posts about their class leading chapel, learning long vowels, artwork about what heaven looks like and their classroom pets. It has been fantastic to see the classroom community grow as students are proud to see photos of them, their work and their classmates on the blog,

which can be accessed by family members. At the end of term one, students celebrated by holding an official blog launch with their parents and friends invited to share in this new way of learning.

Technology is not something to be scared of and it need not rule the classroom with an iron fist. It is there to enhance learning and teaching. In a world of digital devices we need to be educating children how to use technology responsibly and safely and this is definitely a way to do this, as well as making it enjoyable!

Seeing students focused and willing to write about things they enjoy in the classroom is a refreshing change from those students who find it difficult to put pen to paper.

Fiona Tonissen

Teacher
Trinity Lutheran College
Mildura, Vic



The Learning Support Team has started using iPads with students ...useful in engaging students with learning needs...



...connected environment allows students to research their activities, creatively present the results and submit their work all from the one device...

Trial of iPads at Sunshine

Recently the year 5/6 class at Sunshine Christian School was offered the opportunity to trial iPads as a learning aid in the classroom. This exciting opportunity turned out to be both popular with the students and hugely successful in facilitating learning.

The trial ran for the duration of term 1, initially with lessons being consciously adapted to create opportunities to utilise the iPad.

This was immediately successful in the classroom and quickly evolved to the point where the iPads became an integral part of everyday teaching and learning. Towards the end of the trial the students were themselves suggesting ways to incorporate iPads into their lesson activities.

Much of the advantage of the iPads comes from the large and readily available /

cost effective supply of learning focused applications which can be downloaded directly to the iPads. Applications such as *ShowMe* which allows students to present ideas with photographs, text, voiceovers and drawings, *iMovie* enabling students to present activity outcomes in movie format and *MyPopplet* where students are able to create mind maps and present related information diagrammatically. This store of applications is continuing to be updated and provides an invaluable source of material to diversify the classroom experience.

The connected environment allows students to research their activities, creatively present the results and submit their work all from the one device. Through shared storage facilities like *dropbox* student work is immediately available to the teacher.

The portability, long battery life and the always on operating system significantly increased the amount of work completed in a lesson. The internet connected environment and intuitive operating system increased learning efficiency and student engagement.

As a result of this program Sunshine Christian School has now allocated funding to purchase a dedicated class set of iPads in 2012.

Michelle Clarke

Year 5/6 Teacher
Sunshine Christian School
Sunshine, Vic

Regional news: Lutheran Education Queensland

Review and refocusing for greater student outcomes

For Redeemer staff the introduction of the new Australian Curriculum has been a rejuvenating experience. With our goal to continue to improve student outcomes, and armed with a plethora of student data, we examined our school curriculum and pedagogical practices throughout 2011. Clear goals were developed.

As we implement all four new Australian Curriculum subjects in 2012 we are focusing on ensuring a consistent whole school approach, and data driven teaching that addresses student needs. The introduction of detailed weekly Mathematics and English plans, which specify Learning Intentions and Success Criteria for each lesson, into the whole school planning regime, focuses teachers on teaching to student needs and provides a formative assessment process that directs further instruction. The process of reviewing pedagogical practice highlighted teachers' preferred instructional strategies and the need to cater for students' different learning styles by using a varied pedagogy.

Our year two class took the learning outside the classroom and accessed the experts of our local community as they studied their integrated History, Geography and Science unit in term one. They were investigating how water flows over the land in the form of rivers and creeks and that the water we use all comes from rain via these water systems – either surface water (such as dams) or ground water (bores). An excursion to the local dam and water treatment plant saw budding scientists asking questions of the Sunwater and Water Treatment Plant staff who had come to explain how the dam was built, how it captured water and how the water is treated and then distributed for use.

Learning outside the classroom also happens as our year seven students take part in PALS (Pupils Adopting Loving Seniors). In the PALS program students adopt an elderly friend from the local retirement village, they correspond with them regularly via the 'old fashioned' communication method of letters and visit them each term. Participating in bocce competitions, playing bingo and providing entertainment, the students build intergenerational relationships and learn by giving.

Technology is used widely throughout the school. The mobility of laptops and iPads provide tools for learning inside and outside of the classroom. Our year six class is trialling the implementation of iPads this year before a whole school implementation next year. This class is also using robotics to focus student development of problem solving and team work skills. A great opportunity for students who learn through doing to shine!

Jenni Krenske

Principal
Redeemer Lutheran Primary School
Biloela, Qld

Education, enjoyment, access and community

Education, enjoyment, access and community describe the intended outcomes of our eSchool program at Good News. We are achieving this through the provision of multiple types of devices, a targeted approach to digital literacy development, purposefully integrating ICTs into the curriculum and creating fun, safe cyber environments for students to work, communicate and collaborate within.

2012 has seen the introduction of a One2One laptop program for years 4-7 and a One2Two

iPad/laptop program across years P-3. Our students are no longer restricted to working in computer labs or classrooms to access ICTs but rather use their laptops, iPads, and iPod Touches across the home and school to access information, communicate and share with one another and to undertake their studies in flexible, enjoyable and creative ways. It's a combination that we are finding to be very flexible and productive.

To support the purposeful application of these devices, all students can access the wireless network from virtually every spot across the campus and we have equipped our teaching spaces with Apple TVs and AirPlay systems that enable students and staff to effortlessly display what's on a laptop or iPad via the interactive whiteboard or a larger computer screen for everyone to easily see. It's not unusual to walk through the school and watch students working with their MacBook Airs at outdoor tables, others taking photos with an iPad of things they've found in the garden or using them to gather data in the Science lab, to see students switching between apps on their iPod Touches in Music, LOTE, English and Maths, others reading an eBook in a beanbag, some creating digital artwork and others engaging with digital textbooks. But it's not technology usage for the sake of it. The technology supports the learning program instead of determining it.

Through our eConfidence program, Good News is committed to the regular, purposeful education and training of staff and students in the use of ICTs in order to develop and expand their digital literacy and ICT competency. We desire to develop tasks where modification occurs through a significant task redesign or even redefinition, in which a previously inconceivable task is achieved with the device,



Using robotics to focus student development of problem solving and team work skills.



...technology supports the learning program instead of determining it.

program or app. Our ICT Integration Teacher, Sarah Atkins, is largely responsible for this skill development through her weekly class lessons (in which teachers also participate), by sitting with teachers during their planning time and by providing regular workshops for staff during and after school.

As a community, we also want our students to remain safe whilst using the technology, so a key component of the IT program is education about cyber-safety, cyber-responsibility and appropriate 'netiquette'. This is incorporated into lessons for students and as part of staff workshops, but our next area of focus needs to be parental education. To provide the greatest protection for our students, home and school need to be on the same page and schools need to take a greater responsibility for achieving that.

Having provided the access and ensuring the quality of the education, there is a high level of engagement by students in the curriculum and the learning process at Good News, and they are buzzing with enthusiasm and energy. Access – yes; enjoyment – absolutely; education – without compromise, and community – building strongly. I look forward to where we'll go next.

Adam Richardson

Principal
Good News Lutheran School
Middle Park, Qld

Purpose, discernment and heart

Where there is so much that we can do, the real question is what we should do. What will young people need to thrive in the 21st century and what will the children at the start of the 22nd century wish we had encouraged their great grandparents to learn? For many

of us, we are the people in the 21st century whose grandparents or great grandparents were the children at the start of the 20th century. What are we glad they knew?

Howard Gardner in his book, *Five Minds for the Future*, touches on some key issues. These include the importance of young people having a depth of understanding of disciplinary knowledge, before they can apply it to trans-disciplinary thinking. He advocates the importance of going beyond the superficial, seeing connections and becoming expert at something. With mass information at their fingertips, young people will need to be taught how to discern, to synthesise and have their creativity nurtured. The importance of young people being able to act ethically and respectfully is also critical in a closely connected world which will face complex questions including those related to food production, sustainability of resources and environmental issues.

Brain research is showing that deep thought, dialogue and reflection are critical for the development of young brains, including the frontal part which is responsible for compassion and empathy and also plays an important part in the regulation of our bodies.

But back to our grandparents. What are we glad they knew? For many of us, we were fortunate that they knew the importance of a God who was always with them. In the midst of world wars, depression and great change, this faith and personal relationship with God enabled them to live lives filled with hope, courage, love and acceptance, to be humble, just and forgiving, and to use their gifts in service to others striving for quality in all they did.

As we take advantage of the richness that new technology brings to learning, including the

ability to personalise, to enliven and to bring real world problems and global connection into learning, we are conscious of the fact that many of our children no longer have grandparents with a personal relationship to God. Children often live busy lives with limited time for reflection and deep connection. They may communicate with many but be really known by few. They may access and produce a lot but learn very little.

As educators in Lutheran schools, we have a great gift to share. We can share with young people and their families the centrality of faith in a loving God. In a busy world we can teach the worth of stillness, quiet, reflection, and the power of God to renew. We can encourage the growth of depth over superficiality in all dimensions of life. We can be intentional in the growth of an understanding of values essential for general well-being in our communities. Through formal and informal interactions in class, on the sports field, in our cultural pursuits, pastoral care, in outdoor education, engagement in service activities and communication processes, we develop strong growth focused relationships with young people and their parents. Through conversation and action beliefs and values are caught. We can be an oasis.

A rich Lutheran tradition in education with Christ at our centre has given us a strong base from which to nurture hearts and minds. We have the time to be discerning, to be purposeful and to support the growth of great grandparents the children of the 22nd century will be thankful for.

Bronwyn Dolling

Principal
Pacific Lutheran College
Caloundra, Qld



ing it.

As educators in Lutheran schools, we have a great gift to share.

Pondering people... pondering profits of The Pathfinders



Stephen Rudolph is the Executive Director of Lutheran Education Australia

Three book launches in five days – Brisbane, Adelaide and Melbourne. Lutheran Education Australia has paid for the launches, a second Australian Lutheran schooling history book and other associated costs. *The Pathfinders'* author, Richard Hauser, has travelled to various parts of Australia for research, interviews and the launches in a retirement focus of love for his church, its schools and our people. And nobody has asked about, nor pondered, *What financial profit will Lutheran Education Australia gain from these ventures?* nor *How much did LEA spend on the two books – Patriarchs and Pathfinders?* And I am pleased they haven't. How could we put a price on our precious history? These books now form a valuable cornerstone for reflections on our past in any consideration of our future directions.

Richard talked a great deal at the book launches about pondering, but none of this was about money making or arguing a business case. His pondering was about Lutheran schools, Lutheran school leaders and the journey we all have travelled through *The Patriarchs: A history of Australian Lutheran schooling 1839-1919* to *The Pathfinders: A history of Australian Lutheran schooling 1919-1999*. He ponders on the journey each of our pathfinders faced in their respective

callings and the raw humanity and vulnerability each of us has in our lives of service as well as in life itself. Hauser writes, 'All of them... are not treated as heroes or saints but as the gifted and sometimes flawed human beings who helped lead the Lutheran educational cause. The telling of their stories will be guided by the twin lights of truth and compassion' (*The Pathfinders*, 2012, p28).

We sat at the launches and not only listened to Hauser, well supported by Roger Hunter, Rolph Mayer and Malcolm Wegener, but also witnessed a number of these real pathfinders, and their loved ones, come forward to receive their complimentary copy, and to be honoured for their service. We saw Gertrude Jacob, Garry Matuschka, and Tom Reuther come forward in Adelaide. Gertrude commenced her teaching in 1937, Garry began his principalship at Tarrington in 1948 and Tom started as a school chaplain in 1954. On behalf of pathfinders no longer with us, Dorothy Tscharke received a book on behalf of her father, Karl Meutzfeldt, while Coral Boesch and Anne Bartel were presented a copy on behalf of their brother, John Zweck.

The commitment and service each of our pathfinders and their loved ones have given to their Lord and Saviour through Lutheran schools, have been recognised in the writings and ponderings of Hauser. These books also cast light on those who are working today in Lutheran schools. Again, women and men wrapped in the daily and sometimes mundane school routines, whom LEA recognises as the key ingredients of service in and for Lutheran schools.

As noted in the foreword of *The Pathfinders*, 'Hauser uses words such as determination, loyalty, courage, faithfulness, passion, persistence and even stubbornness to describe this Lutheran uniqueness; those of us who have known some of the people written about can certainly smile knowing the accuracy of his words and the authentic portraits of the people described.'

While we deeply appreciate and admire Richard Hauser for his service and dedication in pondering these significant volumes on behalf of LEA and the LCA, I also wish to acknowledge each Lutheran school staff member who continues our fine tradition of high quality Christian education.

Thank you for the respect you have for our history and the love you have for your Saviour and our schools, as they continue our commitment to the gospel. Thank you also for pondering how you can use your gifts and contribute to the lives of young people. Please continue to learn from our rich history as you ponder our future.

The Pathfinders (and *The Patriarchs*) can be purchased at the LEA National Office or online at www.lutheran.edu.au (follow the link on the homepage).

Below (from left): Richard Hauser and Mike Semmler present Garry Matuschka, Mike Semmler presents Gertrude Jacob, Richard Hauser and Mike Semmler present Tom Reuther and Richard Hauser and Stephen Rudolph during the Adelaide launch



A full list of references for the articles in this issue is available from the LEA office.