

# Scan



Sample, interactive article from this issue

the journal for educators

share  
transform  
**connect**  
inspire

*inspiring dynamic 21C learning*

**In this issue**

new school library system  
mobile technology  
future learning and literacies  
innovative learning practices  
*Area of Study: Discovery*

# Scan

# Learning and literacy for the future

In this article, June Wall and Karen Bonanno provide an introduction to the research base behind the need for students and teachers to develop new learning skills, formerly known as 21st century learning skills. An outcome of this research has been the recognition of the need for teachers to upskill in these new areas. It presents the argument for, and research about, the new skills. It will be followed up with a second article on how a capacity building toolkit may be implemented in schools.



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## Introduction

The Young Adult Literacy Services Association forum report (YALSA), *The future of library services for and with teens: a call to action*. (Braun et al., 2014), indicates that success for today's teens in an increasingly global and competitive society will depend on having a set of skills that goes beyond traditional academic skills. The report states the expanded set of skills

*includes learning and innovation skills (i.e. creativity and innovation, critical thinking and problem solving, communication and collaboration), and information, media and technology skills (i.e. information literacy, media literacy, digital literacy, and ICT literacy).*

(Braun et al., p. 3)

There is a concern that young people entering the workforce do not have this skill set.

Research into how teens do research in the digital world revealed positive and negative results. Students are able to access a greater variety of information on the topics that interest them, but teachers specifically identified the following as emerging concerns:

- students' overdependence on search engines
- difficulty of students judging the quality of online information
- general level of literacy of students
- increasing distractions pulling at students
- poor time management skills
- students' potentially diminished critical thinking capacity
- ease with which students can borrow from the work of others.

(Purcell et al., 2012, p. 2)

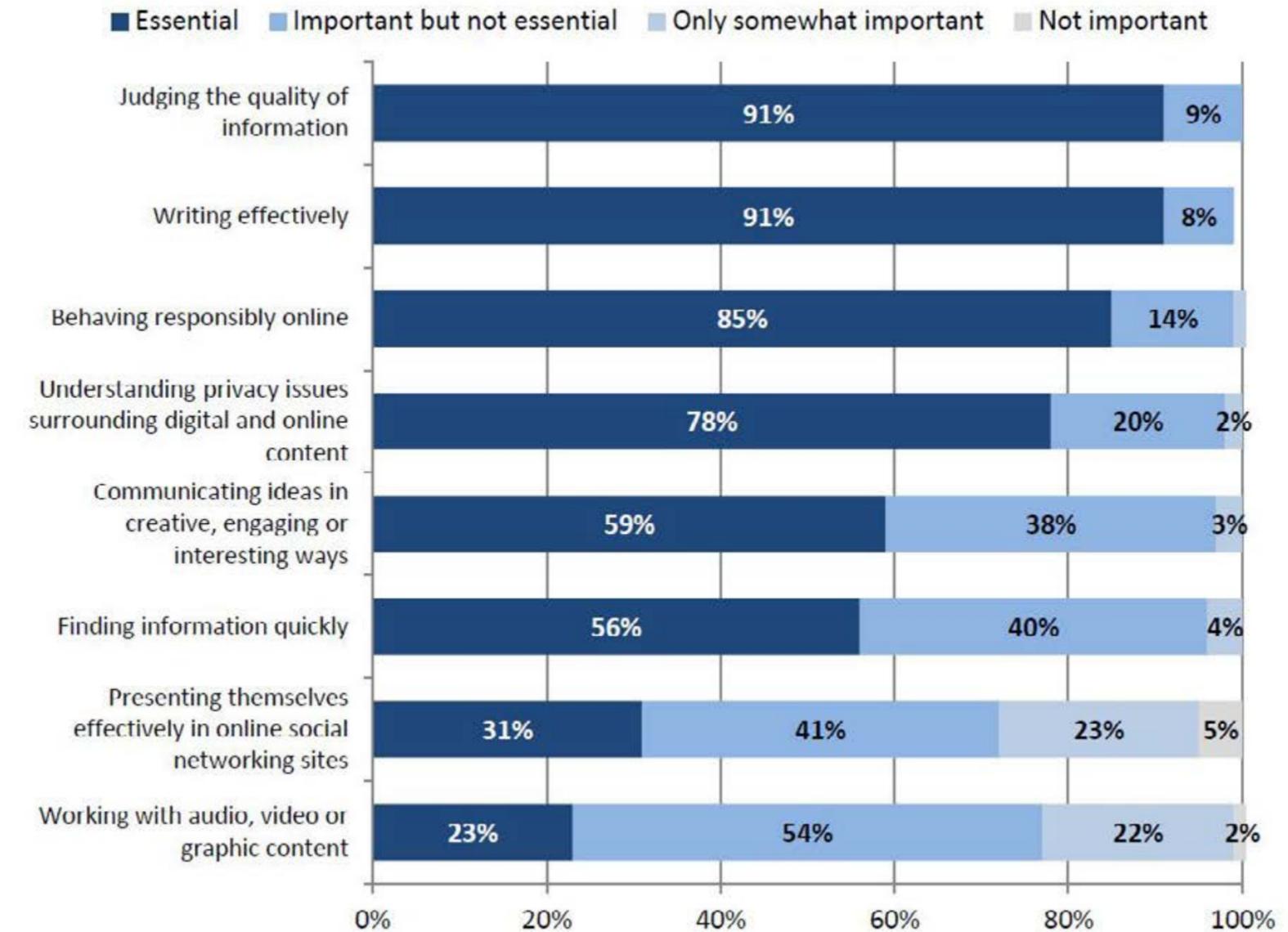
A survey of teachers with advanced skills from the United States (Purcell et al., 2013) also indicated they used search engines to find online information with Google named as the main search tool. They also indicated they use the internet to do work or research for their job and felt very confident in their online search abilities. Even though the teachers discouraged or barred students from using [Wikipedia](#), because of concerns about reliability of content, 87 percent of the teachers used *Wikipedia* as an information source.

As expressed by a number of educators and educational groups in *Making time for great teaching* (Jensen et al., 2014), professional learning for teachers is often poorly delivered, fails to produce better outcomes for students, is not directly suited to the needs of the teachers and fails to improve their capacity to teach.

If our students are going to be able to enter the workforce with relevant and appropriate skills, it is imperative that teachers have access to and can participate in capacity building professional learning that directly helps them to teach their students.

### What Skills Do Students Need For the Future?

How important do you feel each of the following skills is for your students to be successful in life?



Source: The Pew Research Center's Internet & American Life Project Online Survey of Teachers, March 7 to April 23, 2012, n=2,462 middle and high school teachers.

Figure 1: Skills students need for the future (Purcell et al p. 47, 2012)

## Future work skills

Local and national factors in future work skills are no longer the primary driver of change. Global factors affect all areas of work and life. These factors have been identified (Störmer et al, 2014) as:

- Emerging economies [leapfrogging](#) existing economies in the need to find a manufacturing base as rapid growth to a knowledge base occurs. These economies are becoming part of the global production chain without a prior industrial base.
- The opening of borders and greater or easier access to travel has meant an increase in migration to where the work is. As a consequence, the workforce demographics are changing rapidly.
- Technology is dissolving barriers, which enables greater control by individuals and greater possibilities for where work occurs.
- As a result of the above factors, organisations are changing their structures to allow for an agile economy, changing workforce and increasing use of new technologies.

The [School libraries 21C](#) (Hay and Todd, 2010) and the [Future learning and school libraries](#) (ASLA, 2013) papers both identified a changing skill set for student and teacher learning. Recognition of the skills required for future work (Störmer et al, 2014; Davies,

2011; Wagner, n.d.) focus on capabilities of agility, critical thinking and the new media. Table 1, on the next page, maps identified work skills to required learning skills (ATC21S, 2012; Economist Intelligence Unit, 2014; Wheeler, 2013). Students and therefore teachers need skills in:

- leadership
- critical thinking
- creativity
- agility
- digital literacy
- communication
- problem solving
- global citizenship
- design thinking
- collaboration
- interpersonal relationships.

Critical thinking and the ability to ask the right questions is the core and the ability to develop new ideas rapidly from analysis is vital. The ability to work in a range of teams (physical and virtual) over a range of media tools also enables the student to have influence on leadership or make informed decisions. Students will need to be able to take and show initiative and be able to communicate their ideas or actions effectively. In order to take these actions, students will need to know how to analyse trends and patterns and therefore be able to critically evaluate



Asia Society: [Seven skills students need for their future](#)

information sources and information.

The development of these skills in students will therefore require a corresponding development in these skills within the teaching profession. As Hattie (2013) reiterates [in this clip](#), the greatest impact on student achievement is the quality of the teacher.

## Future Technology

The impact on education of the rapid development in a range of technologies has been noted in particular by the [Horizon reports](#) (Johnson et al, 2013



John Hattie at TEDx, 2013. [Why are so many of our teachers and schools so successful?](#)

## Future work skills and required learning skills

Future Skills	Education or learning skills		Work or Lifelong learning skills		
Future skills for learning - meta view of research	21c Learning skills	21c Learning skills / Learning Curve report	7 Survival skills	Future work skills 2020	The Future of work: jobs and skills 2030
Leadership	Decision-making	Leadership Entrepreneurship	Leadership by influence Entrepreneurship	Cognitive load management	Self-management
Critical thinking	Critical thinking		Critical thinking	Sensemaking	Lifelong learning
Creativity	Creativity		Curiosity and imagination	Novel and adaptive thinking	Adaptation Flexibility
Agility			Agility and adaptability Initiative	Transdisciplinarity	Agility Resilience
Digital literacy / transliteracy	ICT literacy Information literacy	Digital literacy	Accessing and analysing information	New media literacy	ICT skills Lifelong learning
Communication	Communication	Communication	Effective oral and written communication		
Problem solving	Problem solving	Problem solving	problem solving	Computational thinking	Lifelong learning
Global citizenship	Citizenship	Global citizenship		Cross cultural competencies	
Design thinking				Design mindset	Lifelong learning
Collaboration	Collaboration Life and career	Team working	Collaboration	Virtual collaboration	Virtual environments Hybridisation of skills
Interpersonal relationships	Social responsibility, Personal responsibility	Emotional intelligence		Social intelligence	Lifelong learning

Table 1: Identified future work skills mapped to required learning skills

and 2014). Future technologies have an impact on the growing need for skill development that is ongoing and lifelong.

The greater impact in education will be from the *Bring your own technology* (BYOT) and cloud computing developments. These applications will expand pathways and strategies for teaching twenty-four seven through blended learning, flipped classroom and personalised learning environments. A [Gartner report](#) (2013), predicts that by 2017 half of the world’s employers will expect employees to supply their own device so that each person will need to be responsible for their own learning about the use of that device and access to a range of storage mechanisms over and above their substantive work load.

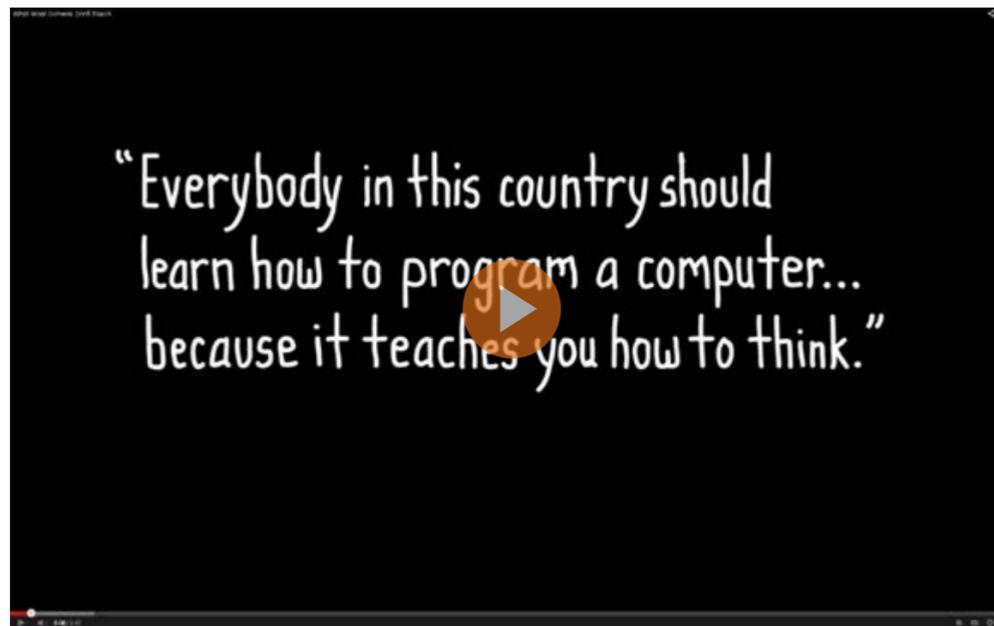
The Horizon report K-12 (2014) identifies [3D printing](#), robotics, and [the internet of things](#) as trends that will impact schools within the next five years.



**What is 3D printing and how does it work?**



**FW: Thinking: [What is the internet of things?](#)**



**Coding: [What most schools don't teach](#)**

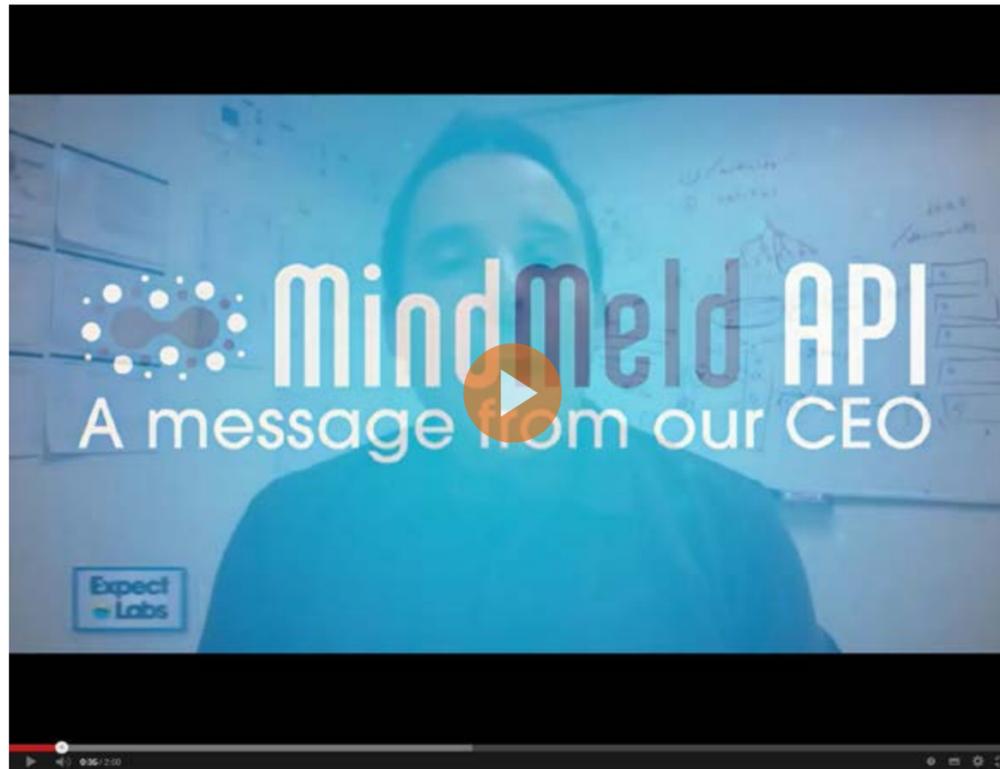
All of these technologies provide greater control and access to an ever widening range of information and knowledge sources and enable activities such as the [makerspace](#) movement and [gamification](#). [Coding](#), or the ability to write a program in a logical computer language, has also been identified as necessary as the technology develops and individuals are more able to construct their own objects or environments.



**Virtual assistants: [Mindmeld](#) product video**

A technology that has been developing for a number of years is artificial intelligence (AI) and this is leading to virtual assistants. Virtual assistants process and act upon information provided.

This new use of technology will also change how learners search and the way this is taught as well as how the processes of learning could be presented or taught.



The [Mindmeld](#) API: a new developer platform

## Challenges

### Developing a sound pedagogical framework

The first challenge focuses on the need to identify and establish a pedagogical framework within the school community that will support the development of the future skills. In NSW, the three dimensions in the [Quality Teaching](#) framework that form the basis for a model for pedagogy are:

- pedagogy that is fundamentally based on promoting

high levels of *Intellectual quality*

- pedagogy that is soundly based on promoting a *Quality learning environment*
- pedagogy that develops and makes explicit to students the *Significance* of their work.

(NSW Department of Education and Training, 2006)

The framework needs to adequately address the future skills for learning within the context of ensuring high quality teaching within safe and supportive learning environments for the benefit of every student.

Intellectual quality presumes cognitive and skill development as students engage with content to develop their understanding of the world and a deeper knowingness.

### Staff capacity

A second challenge is the need to address low digital literacy capabilities in staff. For a number of years the K-12 Horizon reports consistently reported the importance of digital literacy as a key skill in every discipline and profession with the challenge focusing on the lack of teacher training in this crucial area of skills and techniques development. The American Library Association's (ALAOITP) Digital Literacy Task Force has defined digital literacy as

*the ability to use information and communication technologies to find, understand, evaluate, create, and communicate digital information, an ability that requires both cognitive and technical skills*

(ALAOITP Digital Literacy Task Force, 2013).

In the 2013 K-12 Horizon report, an extension of this challenge was identified in the context of technology when schools mandate the inclusion of specific technology.

*Teachers are left without the tools (and often skills) to effectively integrate the new capabilities into their teaching methods.*

(Johnson et al., 2013, p 9).

Despite the recognised importance of digital literacy very little is done to address this in teacher education and relevant ongoing professional learning. While the Australian curriculum's [general capabilities](#) (Australian Curriculum and Assessment Authority (ACARA), 2013) have addressed many of the future work skills and learning skills, including digital literacy, teachers are yet to understand these fully and embed them in their teaching and learning practice. Teachers need to build capacity across a range of skills, techniques and strategies to be able to effectively assist their students to develop future skills for learning.

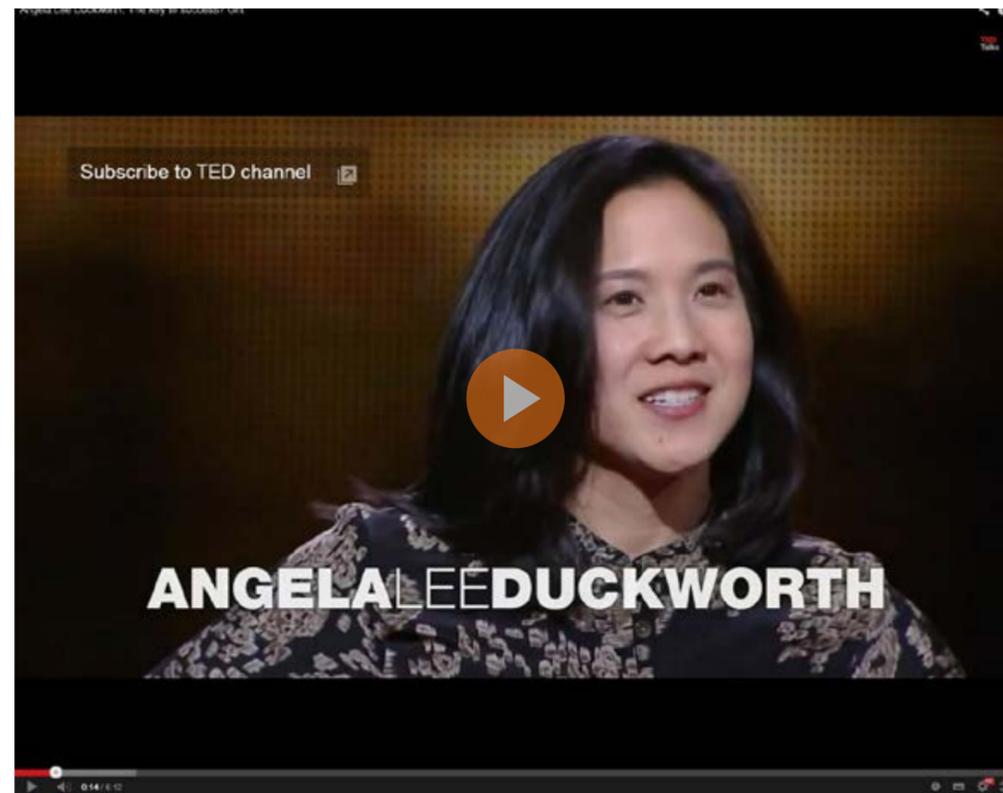
### Authentic learning

The third challenge is the design and delivery of classroom programs to support effective teaching and learning of future skills. Authentic learning allows students to focus on real-world, complex problems and solutions by using, for example, role-play, problem-based approaches, development of case studies and engagement in virtual communities. It could also include [maker/hacker space activities](#) and experiential and hands-on learning. Students need to be engaged in deeper learning to develop the skills and knowledge required for academic scholarship or the workplace.

**BYOD** and cloud computing accommodate more personalised learning opportunities. The student's mobile device and their collection of apps and social media tools become their workspace where they can capture information and relevant items, store content they want to share, complete projects and assignments, work collaboratively with others to create together, and more.

### Grit skills

As teachers endeavour to address the delivery of future skills in a school setting there needs to be the inclusion of the soft skills, especially for the development of a work ethic to persevere against



TEDTalks: [Angela Lee Duckworth: The key to success? Grit](#)

all odds and challenges. Some may refer to these as the social and emotional intelligence skills, or, as Duckworth calls it, *grit* skills (Duckworth; 2013; Smith, 2014). For example, making mistakes isn't failure but necessary for learning.

In order to design and deliver authentic and personalised learning, teachers need to continually update their pedagogies, resource material and frameworks for learning. Using design thinking as a framework may assist in linking learning strategies and content to challenging tasks that will allow for the future skills development of students.

### Learning spaces

The fourth challenge is about designing learning spaces to support the development of future skills. With the increasing investment in technologies combined with the need for learning programs that engage students in learning, new thinking about the design of information and technology-rich learning spaces has to be considered. The design needs to be flexible, adaptable, accessible, future-proofed, bold, creative, inspirational, social, inclusive, supportive, enterprising and sustainable (Joint Information Systems Committee, 2006, p3; Patel as cited in Portelli and Fildes, 2009, p. 23).

### Flexibility

The final challenge relates to moving the current educational system into the 21st century. With a focus on future skill development, reforming curriculum programs, innovative use of technology, designing engaging learning environments and many other

changes, there is a need to be able to respond to and adapt quickly to shift innovative teaching practices into mainstream education. Future skill development leans towards a knowledge-based economy, which puts pressure on the current education structures and systems to change the way we communicate, collaborate, create, teach and learn. It is necessary to think beyond what is familiar in schooling, instruction and curriculum to restructure learning to benefit future generations.

### Conclusion

The combination of developing technologies and corresponding skills and capabilities require students to be competent and capable citizens in a global economy of the near future. This leads to educators considering the learning required for both students and teachers. While the dialogue within the teaching profession has focused on what has been termed 21st century learning skills for students, the discussion now needs to be on developing capabilities for teachers so that they can actively engage students in these new learning capabilities. This will enable teachers to focus on pedagogical practice rather than emerging technologies.

A key finding of the [Innovative teaching and learning](#) (ITL) research report (ITL research project, 2011) was that innovative teaching practices flourish when teachers share their practice, professional learning is active and reflective, and there is a culture of innovation that encourages new types of teaching.

Capacity building for teachers has been recognised in the recent [Future-focused learning report](#) as core to

*the professional development opportunities available for all teachers and leaders, based on sound evidence of what works to build capability.*

(New Zealand Government, p. 14, 2014).

In their framework for teacher development, the Australian Institute for Teaching and School Leadership (AITSL) recognised the need for:

- reflection and goal setting
- learning and professional practice
- effective feedback and review.

Capacity building for all teachers must include this framework but should also recognise the rapidly adopted methods of formal and informal learning in the workplace that organisations are implementing (Cairnes, 2014).

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