



THE NEW BASICS:

Big data reveals the skills young people need for the New Work Order

FYA's New Work Order
report series

fya



At the Foundation for Young Australians (FYA), we believe young people are ambitious, creative and capable of rethinking the world and solving tomorrow's problems today.

FYA is a national for-purpose organisation that is all about backing the next generation of young people who are going to rethink the world and create a better future. At FYA we connect and inspire young changemakers - the innovators, the makers, the dreamers, the thinkers, the doers and the creators.

Find out more at fya.org.au

This report is part of FYA's series the 'New Work Order'

This report was prepared for the Foundation for Young Australians by AlphaBeta.

AlphaBeta is a strategy and economic advisory business serving clients across Australia and Asia from offices in Singapore and Sydney.

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We can no longer delay investing in the future of young Australians. For the first time, big data analysis shows us that the New Work Order is here.

Over the past 18 months, the Foundation for Young Australians has produced a series of reports to understand the economic and social conditions affecting young people today and into the future – and to chart a course for how we best prepare young people to drive economic and social progress in decades to come.

Our New Work Order report confirmed Australia is undergoing the most significant disruption in the world of work since the industrial revolution, and how we respond has huge implications for the next generation. The shifts in the local and global economy are creating new opportunities for our industries and our way of life, but they also present significant challenges and failure to act will see our nation left behind.

Amid these changes, Australia's 4.3 million young people are our greatest resource. It is the next generation who will inherit the outcomes of the decisions we make today and will have to navigate a future we can't yet even describe. As our population ages, the ability of our growing youth population to participate in, contribute to and shape our economy will be crucial in delivering (e) quality of life for all of us.

The New Basics, the next report in this series, analyses big data to show for the first time that the New Work Order is here. The changes we have been predicting are now on our doorstep, affecting employers and job seekers across all industries, providing beyond doubt the growing demand from employers for young workers to have what we call enterprise skills.

These are transferable skills that allow young people to be enterprising so they can navigate complex careers across a range of industries and professions. They include problem solving, financial literacy, digital literacy, teamwork, and communication and are different from technical skills which are specific to a particular task, role or industry.

The New Basics has found, demand for these skills is on the rise – particularly in the jobs of the future. In fact, the so-called jobs of the future demand enterprise skills 70% more than jobs of the past. Jobs that require enterprise skills also pay more.

These new findings demand action to build the skills of the next generation. Our latest report card on *How young people are faring in the transition from school to work* revealed young Australians are not prepared with key enterprise skills; close to a third of Australian 15 year olds have low proficiency in both financial literacy and problem solving as well as a quarter demonstrating low proficiency in digital literacy.

At FYA we are renewing our call for a national enterprise skills strategy, to ensure students across Australia are developing these skills inside and outside the classroom.

A national enterprise skills strategy would:

- Begin early in primary school and build consistently, year on year, throughout high school
- Be provided in ways that young people want to learn: through experience, immersion and with peers
- Provide accurate information and exposure about where future jobs will exist and the skills to craft and navigate multiple careers
- Engage students, schools, industry and parents in co-designing opportunities in and outside the classroom.

We need all young Australians to learn the skills to be digitally-literate, financially-savvy, innovative and adaptable and help them navigate complex careers of the future and thrive in every aspect of their lives.

The decisions we make today will have a true impact on the future of our nation. It truly is time to invest in Australia's future through our young people.



Jan Owen AM

CEO

Foundation for Young Australians

OVERVIEW

Enterprise skills

are **transferable skills** required in many jobs. They include:



Problem solving



Communications



Financial literacy



Critical thinking



Creativity



Teamwork

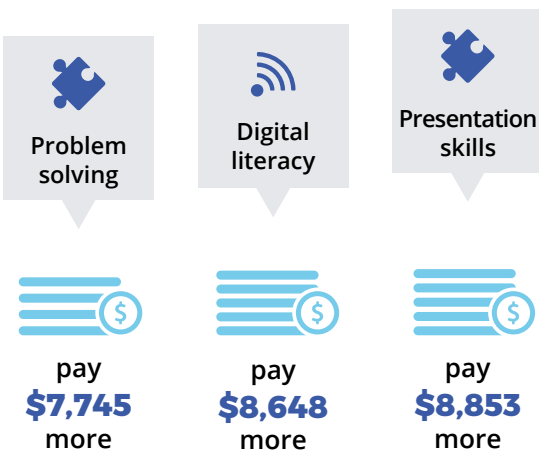


Digital literacy



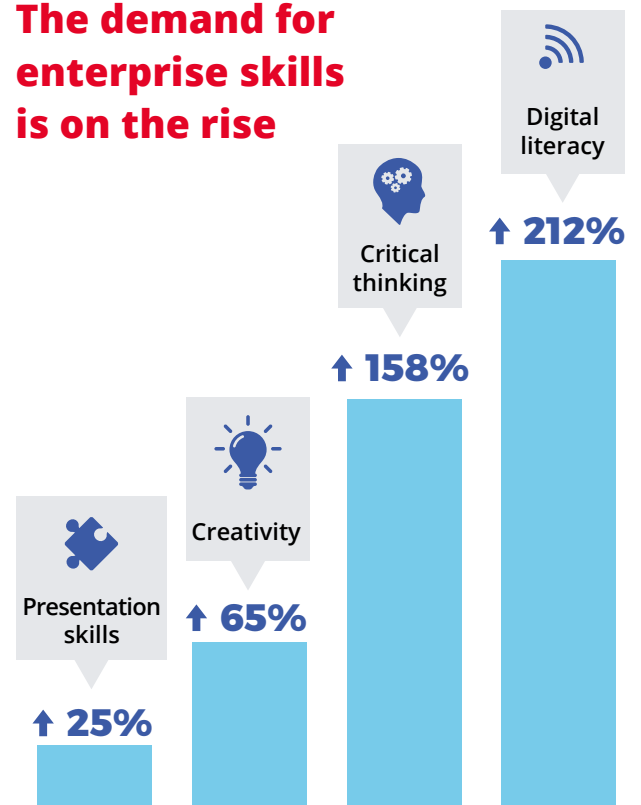
Presentation skills

Wages are higher for young job-seekers with enterprising skills



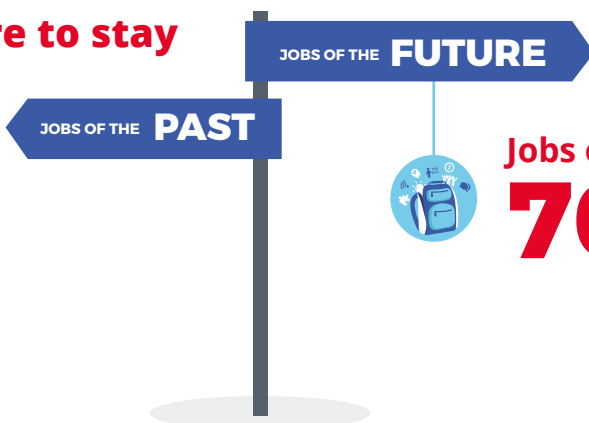
...as compared with similar earlycareer job ads that don't request these skills.

The demand for enterprise skills is on the rise



...as observed in earlycareer job ads over the past 3 years

The trend is here to stay



Jobs of the future demand enterprise skills **70%** more than jobs of the past

SETTING THE SCENE...



What are “enterprise skills?”

Enterprise skills are **transferable skills** that enable young people to engage with a complex world and navigate the challenges they will inherit.

Enterprise skills are not just for entrepreneurs; they are skills that are required in many jobs. They have been found to be a powerful predictor of longterm job success.

Skills classified as enterprise skills include:

Problem solving

Communication skills

Digital literacy

Teamwork

Presentation skills

Critical thinking

Creativity

Financial literacy

The terms used to describe these skills vary across different contexts: sometimes called generic, soft, or 21st century skills. However, the meaning is clear: a set of skills and characteristics that enable young people to confront the challenges of change and navigate a complex future.



What are “technical skills?”

By contrast, technical skills are often **specific to a particular task, role or industry**. Technical skills include qualifications such as licences, certificates or degrees but also include skills acquired on-the-job that are specific to a role or industry.

Such skills may include surgical procedures if you are a veterinarian, hair styling techniques if you are a hairdresser, or Javascript if you are a computer programmer.

Using big data

This report uses big data to understand what employers want from young people:

- The data was collected from more than 6000 websites, from which 4.2 million unique job advertisements were retrieved over the past three years.
- Duplicated job advertisements were removed to ensure no job was double counted.
- From each posting, approximately 50 fields of information were extracted, including data about job title, occupation, industry, skill requirements, education requirements, salary, and experience required.
- Skills were standardised from a range of synonymous words used in job postings.

For technical information on this data please contact AlphaBeta.



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1. INTRODUCTION

Over the past 25 years, a revolution has been occurring in the way we work in Australia. We have lost more than 1 million lower-skilled jobs in manufacturing, administration and labouring but gained more than 1 million jobs in the knowledge and service industries.¹ The pace of innovation and automation sweeping through our workplaces has prompted thought leaders and policy makers to argue that young people need more enterprise skills (often called “generic”, “21st century” or “transferable” skills) that can be used across multiple roles and occupations.² Recently, the OECD argued that “*the increased rate of innovation across economies requires the workforce to possess both technical competence and ‘generic skills’ – problem solving, creativity, team work and communication skills*”³.

With the advent of big data, we can determine the extent to which enterprise skills actually matter in the labour market. Online job advertisements provide a window into the types of skills that employers value most. We analysed 4.2 million online jobs postings over 2012 to 2015 in Australia from more than 6000 sources to definitively uncover what employers want. We filtered these jobs for early-career roles that are relevant to young people, namely jobs that specify 0-2 years or 3-5 years of work experience.⁴

We found that demand for enterprise skills in early-career jobs is on the rise and is likely to continue into the future:

- **Demand for enterprise skills has been rising over time:** Over the past three years, employers have listed more enterprise skills in their job advertisements. As examples, the proportion of jobs that demand critical thinking has increased by 158%, creativity by 65%, presentation skills by 25% and team work by 19%.
- **Wages are higher for job-seekers with enterprise skills:** Key enterprise skills are highly rewarded. Compared with jobs that do not list these skills, jobs that request presentation skills paid an additional \$8,853 per year, digital literacy an additional \$8,648, problem solving an additional \$7,745, financial literacy an additional \$5,224 and creativity an additional \$3,129. This pay premium reflects the value that employers place on these skills and their relative scarcity.
- **Jobs of the future demand more enterprise skills:** The jobs of the future, or those jobs that are least likely to be automated, demand enterprise skills 70% more frequently than the jobs of the past. These findings suggest that the importance of enterprise skills will continue to grow.
- **Employers now ask for enterprise skills as often as technical skills:** In an average job advertisement for a young person in 2015, employers are 20% more likely to specify enterprise skills than technical skills.
- **Many enterprise skills are demanded in jobs across all occupations and industries:** For most industries, enterprise skills are more than 50% of the skills requested by employers of young candidates. Some skills are also demanded in most occupations, not just the occupations that we stereotypically associate with the skill. For example, digital skills are not limited to technology-specific fields but are instead required in jobs as diverse as veterinarian, art director, personal assistant and dentist.

¹ Australian Bureau of Statistics, Detailed Labour Force Catalogue 6291. Calculated by taking the difference between the percentage growth in the number of jobs by occupation and the % growth in the total labour force from 1991 to 2015.

² OECD (2012), Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies, OECD Publishing

³ Toner, P. (2011), “Workforce Skills and Innovation: An Overview of Major Themes in the Literature”, OECD Directorate for Science, Technology and Industry Working Paper Series, SG/INNOV(2011)1, OECD Publishing p8

⁴ For details on this data source, please contact AlphaBeta



This report provides clear evidence that employers want these skills from young people - but do young people in Australia possess these skills? While transferable skills are challenging to measure and strong data on all skills is unavailable, we do have high quality data on rates of financial literacy, problem solving and digital literacy. Critically, around one-third of Australian 15 year-olds are not proficient in problem solving, financial literacy or digital literacy.⁵ Furthermore, only 1 in 10 teachers have recently participated in professional development to help students develop generic, transferable skills for the future workplace.⁶

Given that many young people remain ill-equipped for what employers are demanding, we need to better

promote these skills in our education and training systems. The final section of this report examines how the skills most commonly demanded by employers, like communication, teamwork, problem solving, creativity, and digital literacy, can be built into our training systems by:

- Setting the scene with curriculum;
- Rethinking teaching methods;
- Developing teachers;
- Partnering with employers; and
- Providing a clear picture with live labour market data.

⁵ De Bortoli, Lisa and Macaskill, Greg, "Thinking it through: Australian students' skills in creative problem solving" (2014). <http://research.acer.edu.au/ozpisa/18>; Thomson, Sue and De Bortoli, Lisa, "Preparing Australian students for the digital world: results from the PISA 2009 Digital Reading Literacy Assessment" (2012). <http://research.acer.edu.au/ozpisa/10>; ACER (2014) *Financing the future: Australia students' results in the 2012 PISA Financial Literacy assessment*

⁶ ACER (2014) *Australian teachers and the learning environment: An analysis of teacher response to TALIS 2013*

2.

HOW IS WORK CHANGING IN AUSTRALIA?

Our workplaces have fundamentally changed over the past three decades. In Australia, we have lost around 100,000 machinery operators, 500,000 secretaries and clerks, 400,000 labourers and nearly 250,000 technicians.⁷ Offsetting these losses, there has been an explosion of 700,000 jobs in professional services and more than 400,000 jobs in community and personal services. In short, we have witnessed a shift away from lower skill or manual roles towards roles with higher skill or high interpersonal contact (Exhibit 1).

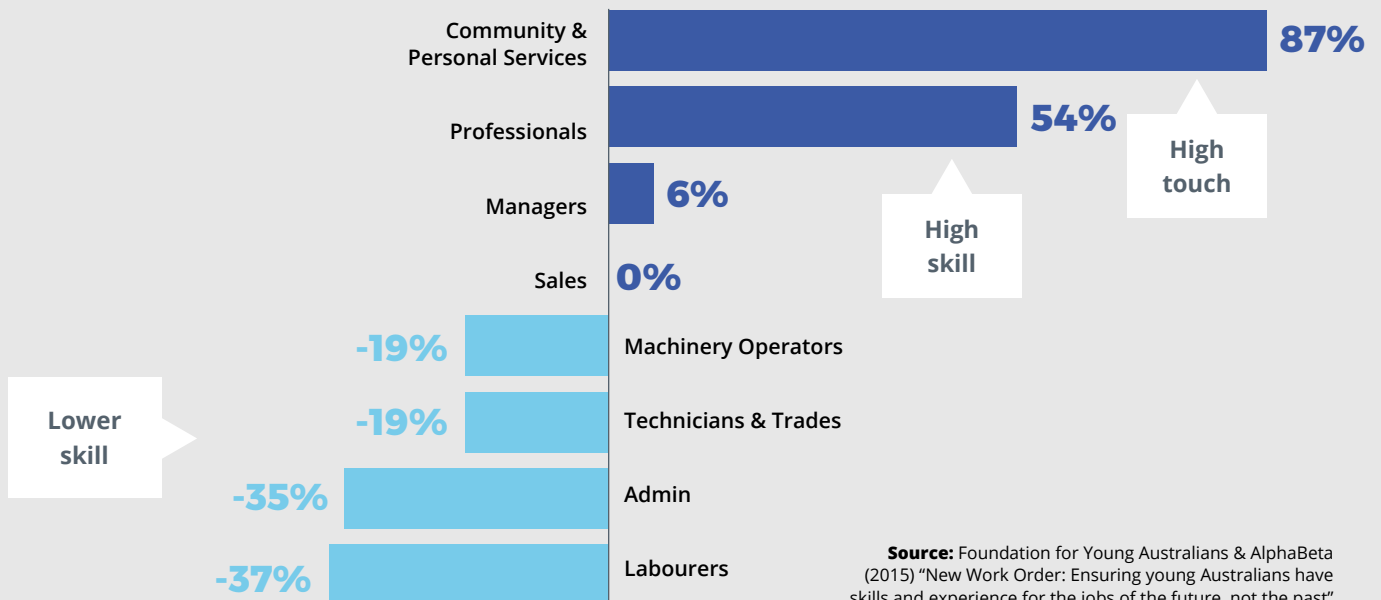
The ongoing rate of innovation and automation in our economy will persist. In Australia, some 40% of jobs are estimated to be highly affected by automation in the next 10 to 15 years.⁸ The rate of innovation and automation affecting our workforce has prompted key commentators to indicate that young people will need to possess

transferable skills that can adapt to new jobs.⁹ The OECD has argued that *“the increased rate of innovation across economies requires the workforce to possess both technical competence and...‘generic skills’ – problem solving, creativity, team work and communication skills.”*¹⁰ Now, using big data, we can definitively understand whether employers want these enterprise skills from young job applicants.

A better understanding of employer demand may go some way to helping explain the mismatch between Australian employers and young people. Youth unemployment is high, and youth underemployment is even higher, with hundreds of thousands of young Australians struggling to find full time work. Paradoxically, Australian employers are hungry for talent but report that they have difficulties finding young people with essential workplace skills.

Exhibit 1: Growth in occupations over past 25 years

Growth in number of jobs by occupation – growth in total labour force, %, Australia



⁷ Australian Bureau of Statistics, Detailed Labour Force Catalogue 6291. Calculated by taking the difference between the percentage growth in the number of jobs by occupation and the % growth in the total labour force from 1991 to 2015

⁸ Committee for Economic Development of Australia (2015) “Australia’s future workforce” Chapter 4

⁹ OECD (2012), Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies, OECD Publishing

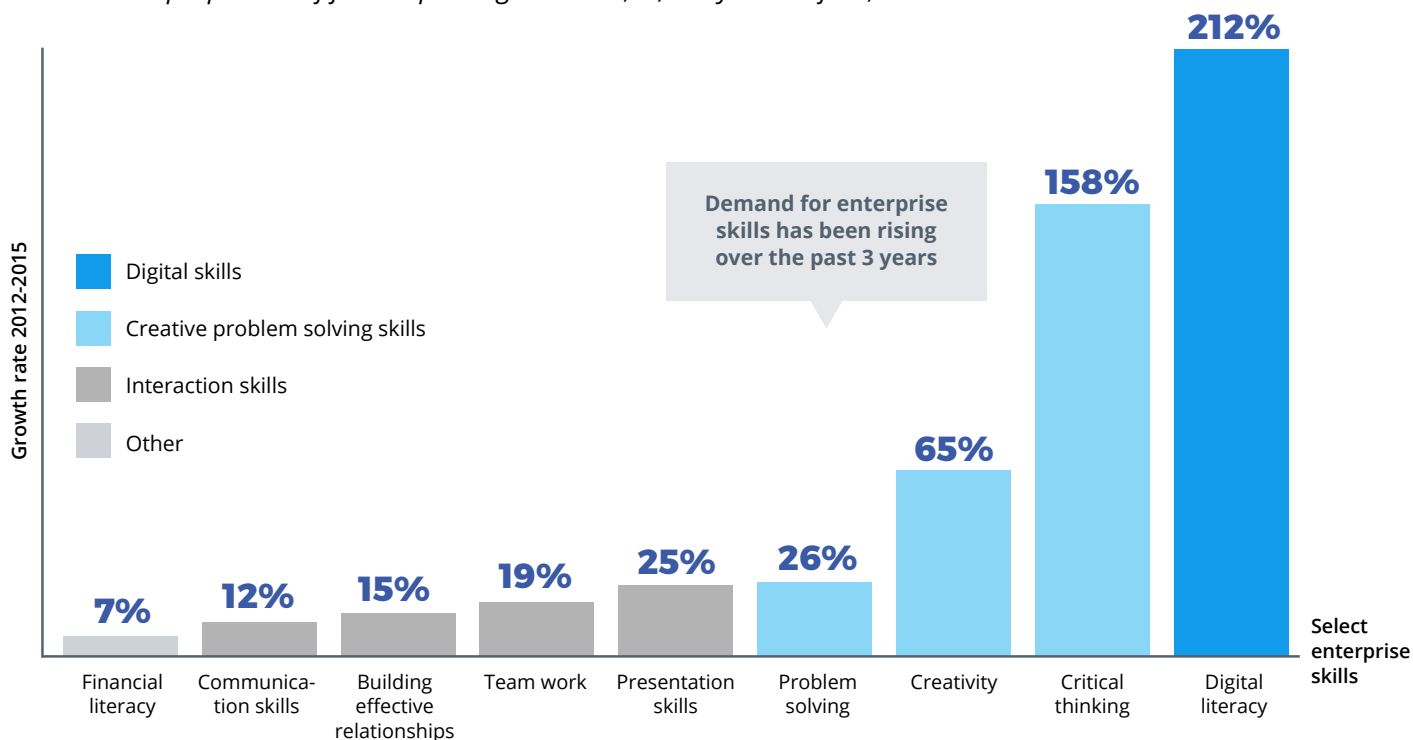
¹⁰ Toner, P. (2011), “Workforce Skills and Innovation: An Overview of Major Themes in the Literature”, OECD Directorate for Science, Technology and Industry Working Paper Series, SG/INNOV(2011)1, OECD Publishing p8

3.

WHAT SKILLS DO EMPLOYERS WANT FROM YOUNG PEOPLE?

Exhibit 2: Recent growth in demand for select enterprise skills

Growth in proportion of jobs requesting each skill, %, early-career jobs, 2012-2015¹²



Rather than guessing what employers want from their entry-level and early-career hires, or relying on anecdotal or survey data, we can learn from job advertisements. Job advertisements provide a window into the types of skills that employers value most. Each advertisement lists skills that an employer finds essential or desirable.

While it is acknowledged that online job advertisements do not cover all jobs on offer, research suggests they do represent a substantial proportion of demand for labour. The myth that some 80% of jobs are “hidden”, or never advertised, has been quashed by recent analysis in the US of online job postings and Government vacancy surveys.¹¹ The research found that 60 to 70% of jobs are advertised online. Further, jobs that are less senior are more likely to be advertised than recruited offline via networks.

We analysed 4.2 million job postings from 2012 to 2015 in Australia, which were collected from more than 6000 sources, to definitively uncover what employers want. We

filtered these jobs for early-career roles that are relevant to young people, namely jobs that specify 0-2 years or 3-5 years of work experience.

We found that demand for enterprise skills in early-career jobs is on the rise and likely to continue into the future.

3.1 Demand for enterprise skills has been rising over time

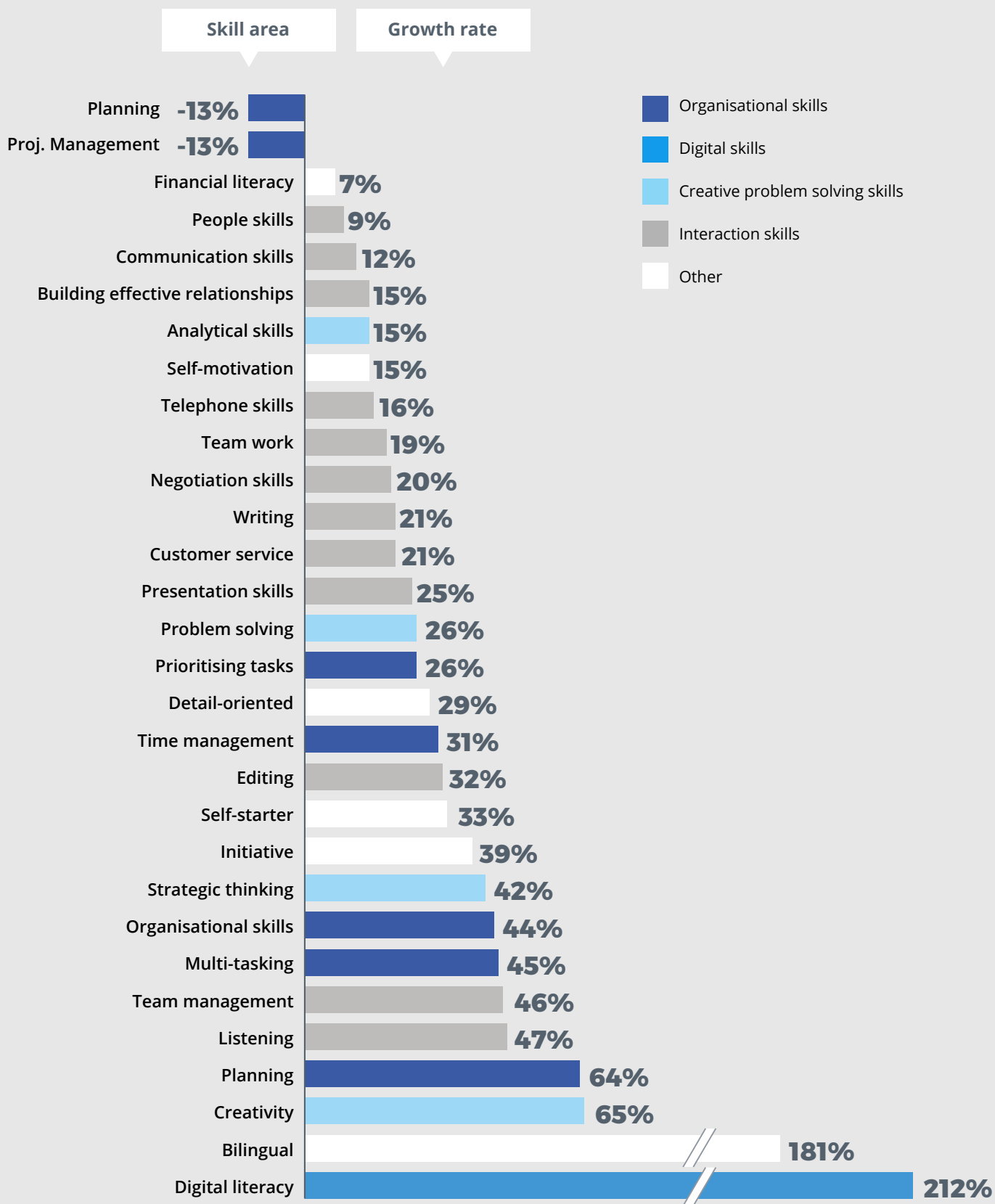
Rising demand for enterprise skills indicates that employers are increasingly valuing enterprise skills. Over the past three years, employers have listed more enterprise skills in their job advertisements. As examples, the proportion of job advertisements that demand critical thinking has increased by 158%, creativity by 65%, presentation skills by 25% and team work by 19% (Exhibit 2).

¹¹ Carnevale et al “Understanding online job ads data” (April 2014) Georgetown University, Center on Education and the Workforce

¹² These skills have been selected from a list of 160 enterprise skills that were analysed. A longer list is provided in the Appendix.

Exhibit 3: Growth rate in select enterprise skills, 2012 - 2015

Growth in proportion of jobs requesting each skill, %, early-career jobs, 2012-15



3.2 Employers pay a premium for many enterprise skills

Whether or not there is a pay premium for enterprise skills is instructive because it signals the value that employers place on these skills and their relative scarcity in the labour market.

Some enterprise skills are highly rewarded. Compared with early-career jobs that do not list these skills, on average jobs that requested presentation skills paid an additional \$8,853 per year, digital literacy an additional \$8,648, problem solving an additional \$7,745, financial literacy an additional \$5,224 and creativity an additional \$3,129 (Exhibit 4).

3.3 Jobs of the future demand more enterprise skills

For a young person today in school, VET or university, the more relevant question is whether the jobs of the future will demand more or less enterprise skills. Recent research on the future of Australia's workforce by the Committee for Economic Development of Australia (CEDA) suggests that some 40% of jobs are at high risk of being affected by automation.¹³ However, we know that automation will not affect all jobs equally. Some jobs will be radically transformed, while other jobs will be less affected.

We define jobs of the future as occupations that are least likely to be affected by automation, as estimated by CEDA. These occupations include professionals, managers,

community & personal service workers, and sales workers. Jobs of the past are defined as jobs in those occupations where at least two-thirds of the jobs are predicted to be affected by automation, which includes technicians, labourers, administrators, and machinery operators.

The findings suggest that the growing importance of enterprise skills will continue into the future. Jobs of the future, or those jobs that are least likely to be automated, demand enterprise skills 70% more frequently than jobs of the past, on average (Exhibit 5).¹⁴ In each specific skill area (e.g. problem solving, communications), jobs of the future demand enterprise skills from 30-680% more than jobs of the past.

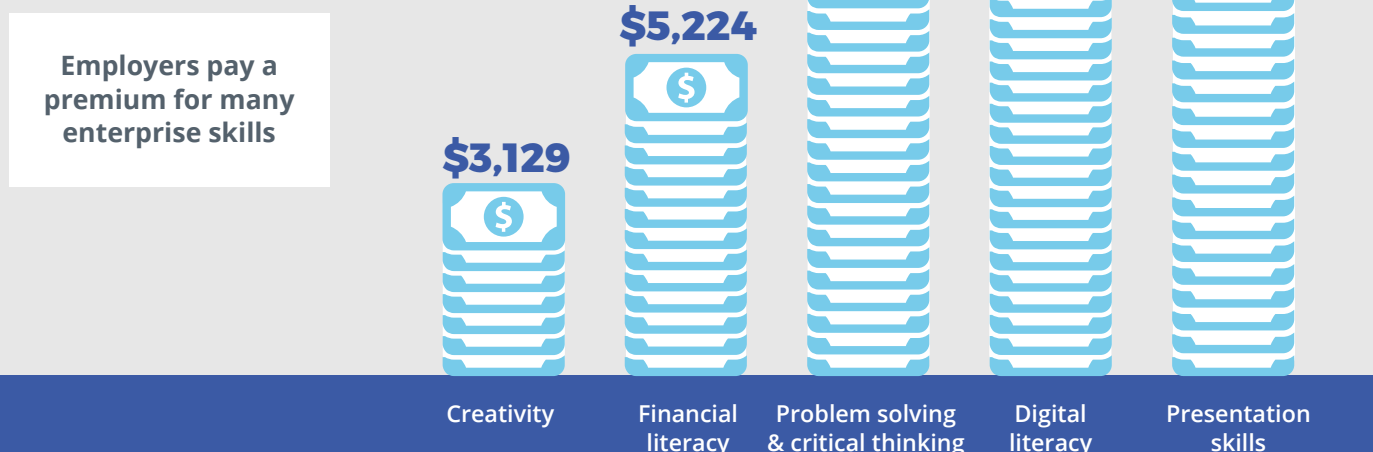
3.4 Employers now ask for enterprise skills as often as technical skills

A comparison of the different types of skills in job advertisements can help us understand the relative priorities of employers.

Employers ask for enterprise skills as often as technical skills. In fact, employers now request 20% more enterprise skills than technical skills. In an average job advertisement for a young person in 2015, employers requested 3.2 enterprise skills and 2.7 technical skills. To demonstrate the relative priority placed by employers on technical versus generic skills, Exhibit 6 extracts the text from two actual job advertisements.

Exhibit 4: Pay premium for select enterprise skills

Mean salary differential for jobs with each enterprise skill & jobs without each skill, early-career jobs, \$



¹³ CEDA (2015) "Australia's future workforce" Chapter 4

¹⁴ This figure reports the percentage difference between the proportion of occupations that are less likely to be automated which demand select enterprise skills and the proportion of occupations that are more likely to be automated.

Exhibit 5: Demand for enterprise skills, by jobs at risk of automation

Difference in proportion of jobs demanding enterprise skills, by occupation, early career jobs, 2015, %

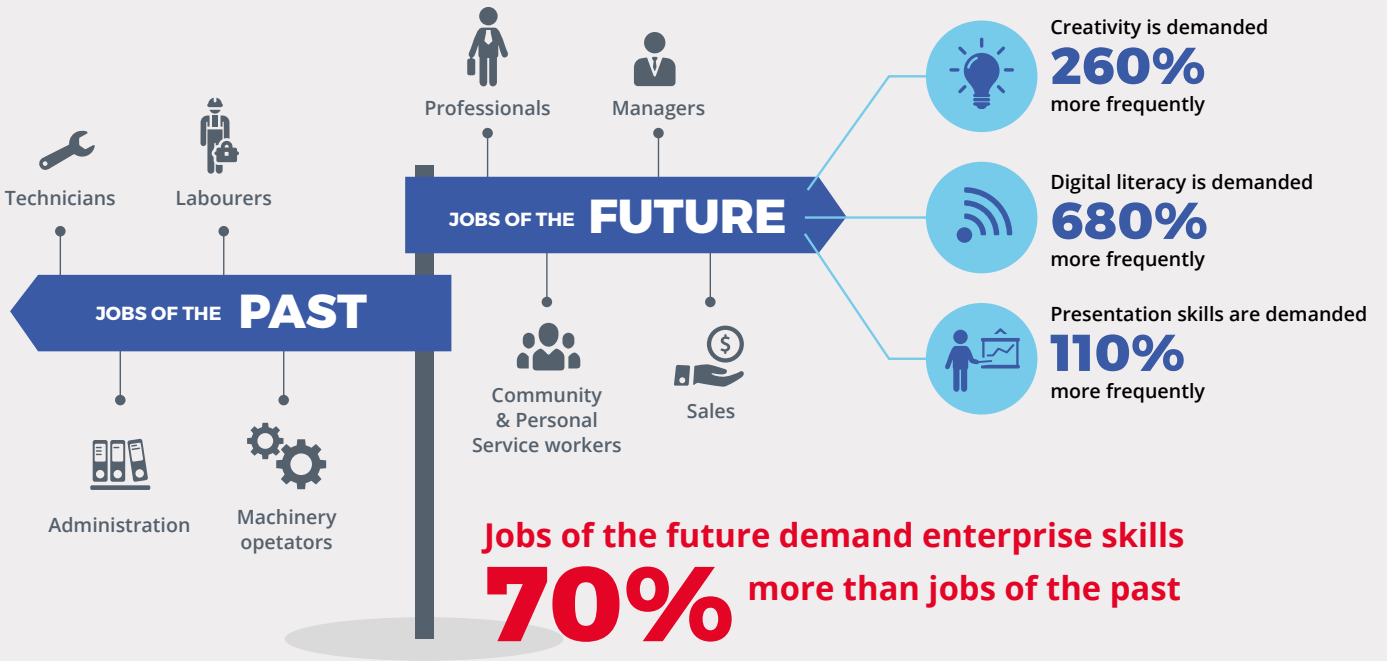


Exhibit 6: Example job advertisements (extracts from actuals)

Full Time Veterinarian

Lambton, NSW

Would you like to work in a vibrant, cosmopolitan city surrounded by amazing surf beaches?

Our leading veterinary practice is looking for a confident vet to join our enthusiastic team! We pride ourselves on our high standards of care and reputation with the community.

Our ideal candidate will possess the following skills and expertise:

- A minimum of 3-4 years' experience as a qualified Veterinarian is preferred, although new and recent graduates are encouraged to apply
- A sound knowledge and understanding of high standards of care
- Experienced in performing routine surgical procedures
- Ability to work collaboratively with fellow team members and build rapport with clients
- Exceptional organisation and communication skills
- A positive & friendly attitude.



2016 Project Coordinator/Business Analyst

Graduate - Sydney

Join our company and work on real projects right from the get go. We employ the best and brightest minds across a wide array of business areas, offering you the opportunity to start building a powerful network of contacts early on your career. On top of that, you'll gain invaluable experience working in and across the world's largest technology and consulting company - collaborating with like-minded people to solve issues that affect our society.

Skills/Knowledge Preferred:

- Proficient in Microsoft Office suite of products (with emphasis on Ms Excel and PowerPoint)
- Strong written and verbal communication skills
- Demonstrated leadership skills
- Ability to work in virtual environment
- Analytical thinking
- Self-sufficiency, good time-management being proactive and creative with solutions
- Strong attention to detail
- Analyse business problems and create solutions

Applicants must meet the following requirements:

- Have Australian citizenship or Australian Permanent Residency
- Have New Zealand citizenship or New Zealand Permanent Residency
- Have at least a credit average from respective universities
- A tertiary degree from a University, having completed studies in 2014 or due to complete last subjects in 2015
- Candidates must be from Australian or New Zealand Universities
- Have no more than 2 years relevant work experience.



= Technical skills



= Enterprise skills

3.5 Many enterprise skills are demanded across all occupations and industries

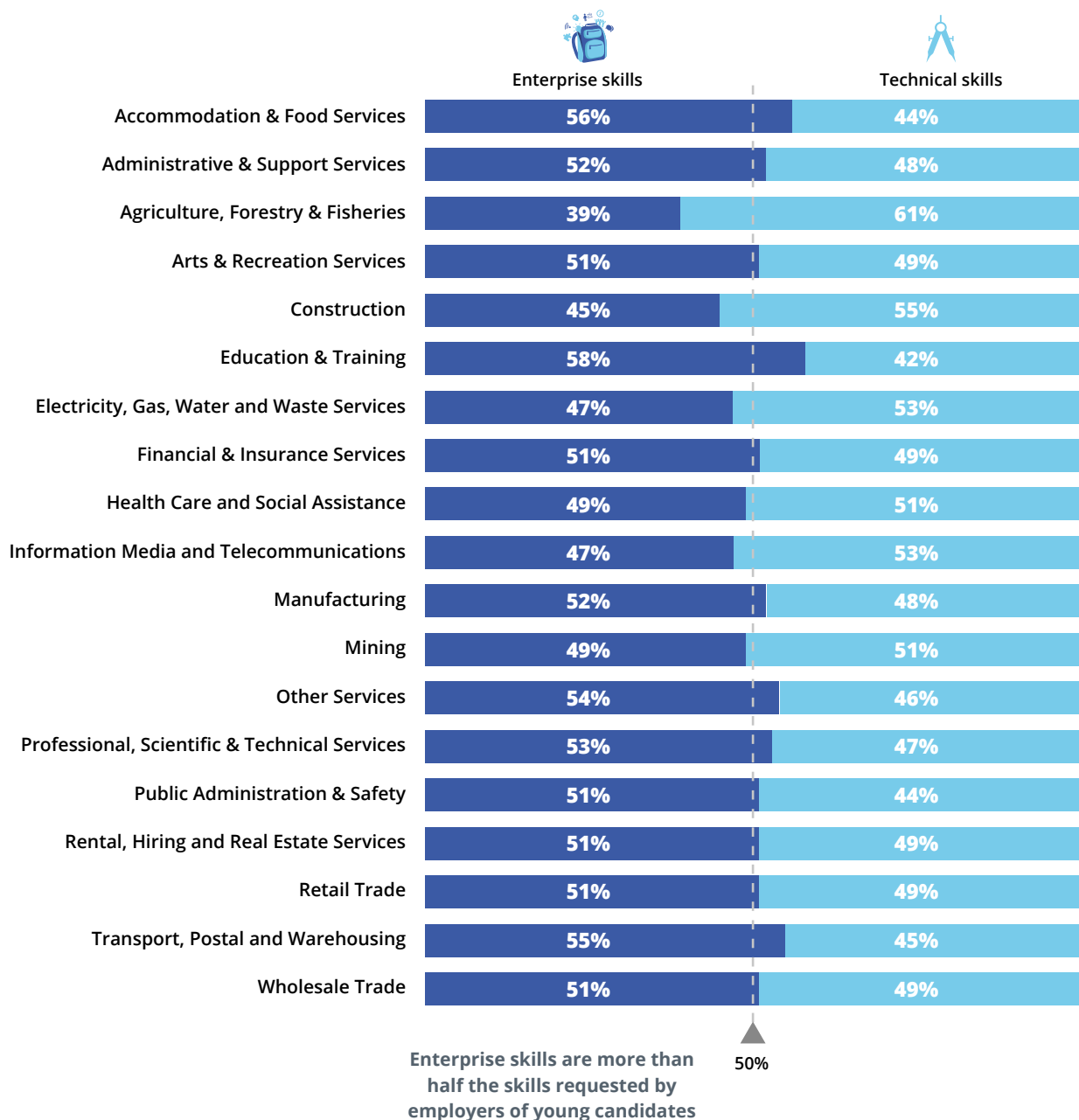
The importance of enterprise skills holds true across the vast majority of industries. These skills comprise at least one-third of skills demanded by employers in every industry. For most industries, enterprise skills are more than half of the skills requested by employers of young candidates (Exhibit 7).

Some enterprise skills are demanded in jobs across all types of occupations, rather than just the occupations

that we stereotypically associate with a skill area. For example, while we typically associate digital literacy with science, technology and engineering roles, digital literacy is demanded in many other types of jobs that are available to young people. In fact, the most common job advertisements that request digital skills from young candidates sit outside the science and technology fields, such as marketing, HR and recruiting. Digital literacy is also demanded in roles as diverse as art director, veterinarian and dentist (Exhibit 8). Communication skills is another example. These skills are so prolific as to be routinely listed in advertisements across every occupation, industry and education level.

Exhibit 7: Demand for enterprise skills and technical skills, by industry

Proportion of total skills requested in early-career jobs by industry, %



Employer demand for digital skills across this breadth of occupations reflects the need for workers to be comfortable with digital technology. A helpful framework for thinking about our workforce digital skill requirements emerged as part of the recent UK Digital Skills Taskforce. Digital skills were classified into four levels:

1. **Digital muggle:** no digital skills required
2. **Digital citizen:** use technology to communicate, find information and transact

3. **Digital worker:** configure and use digital systems
4. **Digital maker:** build digital technology

Our analysis of detailed occupation codes in Australia indicated that more than 90% of Australia's current workforce will need to be at least a digital citizen to function in a digitally-enabled workforce over the next 2-5 years.

Exhibit 8: Most common occupations requesting digital literacy

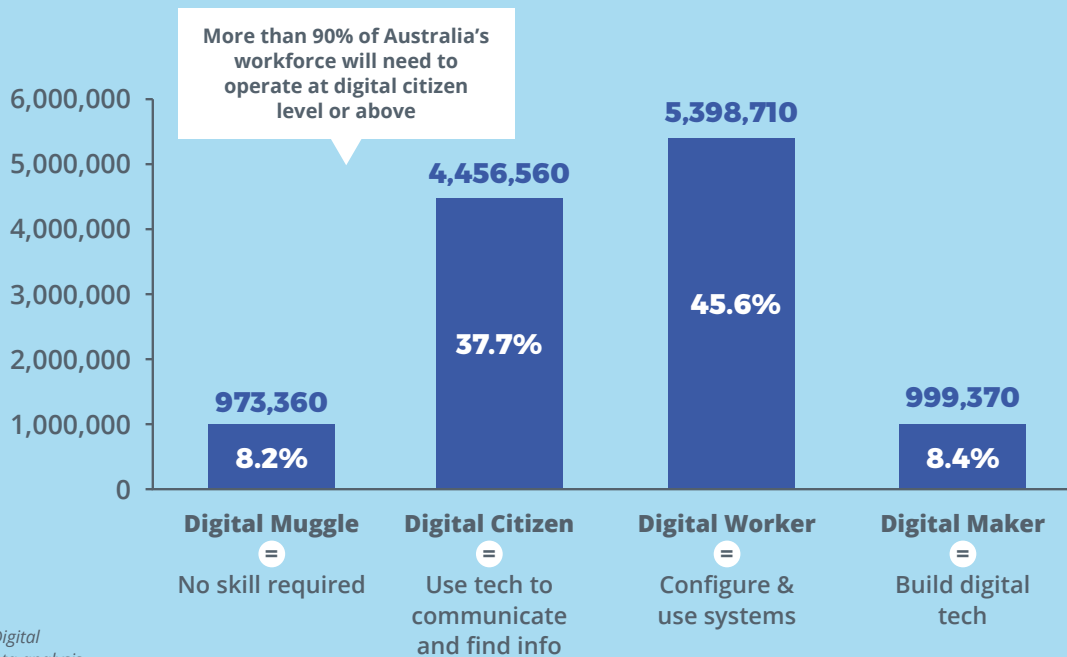
Occupations at 4-digit level* requesting digital literacy, early-career jobs, 2015



*Digit-level refers to the granularity of occupations. Taking the 'Manager' occupation as an example: 1 digit is Manager; 2 digit is Hospitality and Service Manager; 3 digit is Accommodation and Hospitality Manager; 4 digit is Café and Restaurant Manager. There are 358 occupations at the 4-digit-level in Australia.

Exhibit 9: Australia's digital literacy workforce needs in the next 2-5 years

of employed persons, Australia

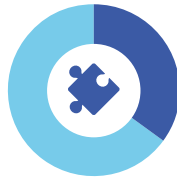


Source: ABS, UK Digital Taskforce, AlphaBeta analysis

4.

DO YOUNG PEOPLE POSSESS ENTERPRISE SKILLS?

Among Australia's 15 year-olds:



35%
demonstrated
**low proficiency in
problem solving**



27%
demonstrated
**low proficiency in
digital literacy**



29%
demonstrated
**low proficiency in
financial literacy**

Quality data on whether young people possess the full range of enterprise skills that they need to succeed in the workplace is scarce. Such skills are often more challenging to measure than technical skills. As research by the RAND Corporation (one of America's pre-eminent social policy research organisations) attests, *"designing tests that measure lower-order thinking skills, such as memorization, is straightforward in comparison to measuring such skills as creativity, innovation, leadership, and teamwork"*.¹⁵

Despite these measurement challenges, the Programme for International Student Assessment (PISA, the international student testing program conducted by the OECD) and other agencies have tested for some enterprise skills including problem solving, digital literacy and financial literacy:

- **Problem solving:** In recent international testing by PISA, approximately 1 in 3 Australian 15 year-olds (35%) demonstrated low proficiency in problem solving.¹⁶ Students with a low socio-economic background and Indigenous students were more likely to be low performers, with 50% of low socio-economic students and 62% of Indigenous students recording low proficiency. Looking forward to their working futures, Indigenous students and students

from low socio-economic backgrounds also reported lower levels of openness to problem solving.¹⁷

- **Digital literacy:** Around 1 in 4 Australian 15 year-olds (27%) demonstrated low proficiency in digital literacy, again in international testing by PISA. Looking forward to their working futures, the OECD has found that "Australian students have a significantly less positive attitude towards computers than on average across the OECD."¹⁸ Unfortunately, low socio-economic and Indigenous students also report lower levels of belief in the importance of working with computers, signaling weaker understanding of the workforce of the future.¹⁹ Low socio-economic students also profess lower confidence in performing high-level tasks on computers.²⁰
- **Financial literacy:** In international student testing conducted by PISA, approximately 3 in 10 Australian 15 year-olds (29%) demonstrated low proficiency in financial literacy.²¹ Likewise, in a survey conducted last year for ASIC on Australian Financial Attitudes and Behaviour, more than 1 in 4 under 35 year-olds (28%) agreed that they "have difficulty understanding financial matters" versus 1 in 10 aged over 35 years (11%).²²

¹⁵ Rand Corporation (2012) "Teaching and Learning 21st Century Skills" Available at <http://asiasociety.org/files/rand-1012report.pdf>

¹⁶ De Bortoli, Lisa and Macaskill, Greg, "Thinking it through: Australian students' skills in creative problem solving" (2014). <http://research.acer.edu.au/ozpisa/18>

¹⁷ De Bortoli, Lisa and Macaskill, Greg, "Thinking it through: Australian students' skills in creative problem solving" (2014). <http://research.acer.edu.au/ozpisa/18>

¹⁸ Thomson, Sue and De Bortoli, Lisa, "Preparing Australian students for the digital world: results from the PISA 2009 Digital Reading Literacy Assessment" (2012). <http://research.acer.edu.au/ozpisa/10>

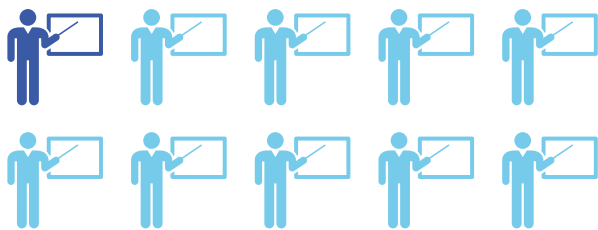
¹⁹ Thomson, Sue and De Bortoli, Lisa, "Preparing Australian students for the digital world: results from the PISA 2009 Digital Reading Literacy Assessment" (2012). <http://research.acer.edu.au/ozpisa/10>

²⁰ Thomson, Sue and De Bortoli, Lisa, "Preparing Australian students for the digital world: results from the PISA 2009 Digital Reading Literacy Assessment" (2012). <http://research.acer.edu.au/ozpisa/10> p92

²¹ ACER (2014) Financing the future: Australia students' results in the 2012 PISA Financial Literacy assessment

²² ASIC (December 2015) Australian Financial Attitudes and Behaviour Tracker. Wave 3: March - August 2015

* Throughout this document the term 'Indigenous' is used to refer to both Aboriginal and/or Torres Strait Islander peoples. Unless otherwise noted, the term should be considered inclusive of both Aboriginal and Torres Strait Islander peoples



Only 1 in 10 teachers

have recently participated in professional development to help students develop generic, transferable skills for future work

The weaker performance of low socio-economic and Indigenous students in these skills raises a serious equity challenge. Given that these skills are increasingly demanded by employers, receive higher salaries and will be demanded in the jobs of the future, the association between disadvantage and lower performance in these skill areas implies that labour market disadvantage will be further entrenched. This is data worthy of serious consideration in attempts to close the gap and tackle equity in education.

In the absence of fulsome data on student performance across all these areas, data on teaching methods and professional development for teachers is also instructive.

Unfortunately, less than half of Australian secondary school teachers report frequently involving students in “small groups to come up with a joint solution to a problem or task.”²³ Around one-third of teachers recently participated in professional development directed toward improving teaching of cross-curricular skills like problem solving or learning to learn.²⁴ Less promisingly, only 1 in 10 teachers have recently participated in professional development designed to support students developing cross-occupational competencies for future work.²⁵ Looking forward, more than 10% of teachers indicated that they have a high level of need for professional development understanding how new technologies are applied in the workplace.²⁶

²³ ACER (2014) Australian teachers and the learning environment: An analysis of teacher response to TALIS 2013

²⁴ Teachers were asked whether they have participated in professional development content in the twelve months prior to the survey that supported “Teaching cross-curricular skills (e.g. problem solving, learning to learn”. ACER (2014) Australian teachers and the learning environment: An analysis of teacher response to TALIS 2013

²⁵ Teachers were asked whether they have participated in professional development content in the twelve months prior to the survey that supported “Approaches to developing cross-occupational competencies for future work or future studies”. ACER (2014) Australian teachers and the learning environment: An analysis of teacher response to TALIS 2013

²⁶ ACER (2014) Australian teachers and the learning environment: An analysis of teacher response to TALIS 2013

5.

HOW SHOULD WE HELP PREPARE YOUNG PEOPLE?

Fortunately, our young people are able to develop the skills that employers are demanding. Having clearly understood that employer demand for these skills is increasing, we need to better support their development in our education and training systems. The skills most commonly demanded by employers, like communication, teamwork, problem solving, creativity, and digital literacy, can be built into our training systems in a number of ways, including by:

- Setting the scene with curriculum;
- Rethinking teaching methods;
- Developing teachers;
- Partnering with employers; and
- Providing a clear picture with live labour market data.

Setting the scene with curriculum

The high demand for enterprise skills underscores the importance of general capabilities being retained and elevated in the curriculum. A number of countries around the world have taken steps to redesign their curriculum and explicitly embed 21st Century competencies and enterprise skills like problem solving, collaboration, global awareness and communication skills into the curriculum (Exhibit 10).

Exhibit 10: International curriculum redesign initiatives

ORGANISATION:
Alberta Education (Canada)



ORGANISATION DESCRIPTION:

Ministry responsible for K-12 education in the province of Alberta

PROGRAM DESCRIPTION:

Alberta's Education Redesign – critical thinking, problem solving and decision-making:

- Alberta undertook its Curriculum Redesign project to better enable students to succeed in knowledge-based economy
- Focussed on critical thinking, problem solving and decision-making
- Aimed at preparing students for opportunities of global economy

Source: OECD (2012), "PISA 2012 Results: Creative Problem Solving", *Students' skills in Tackling Real-Life Problems*, pp. 120. Available from: <http://www.oecd.org/pisa/keyfindings/PISA-2012-results-volume-V.pdf>

ORGANISATION:
Ministry of Education (Singapore)



ORGANISATION DESCRIPTION:

Ministry responsible for school education in Singapore

PROGRAM DESCRIPTION:

21st Century Competencies:

- Identified 21st century competencies: critical and inventive thinking, communication, collaboration, information skills, global awareness and cross-cultural skills
- Developed 21st centuries competencies framework that guides development of national curriculum and school-based programs

"To help our students thrive in a fast-changing world, MOE has identified competencies that have become increasingly important in the 21st Century. These competencies, represented in the framework, underpin the holistic education that our schools provide to better prepare our students for the future."

Source: Ministry of Education (2015), <https://www.moe.gov.sg/education/education-system/21st-century-competencies>



Rethinking teaching methods

Teaching enterprise skills often doesn't require discrete subject matter but instead requires a change in pedagogy. Around the world, leading educators are focusing on inquiry approaches and collaborative work.²⁷ In order to promote 21st century skill development, the OECD has recommended that educational institutions introduce a wider mix of pedagogies including cross-curricular content and team teaching and greater use of inquiry and project-based learning. The best examples involve real-world situations.

Exhibit 11: Japan's integrated learning initiative

ORGANISATION:
Education Ministry (Japan)



ORGANISATION DESCRIPTION:

Ministry responsible for Japan's school curriculum

PROGRAM DESCRIPTION:

Curriculum redesign – promoting integrated learning:

- New curriculum reduced content load by approximately 30% and increased time for “integrated learning” whereby students engage in *cross-curricular, problem-solving* projects
- New national assessments in grades 6 and 9 focused on students' ability to apply knowledge in real-world situations
- Implementation: Education Ministry introduced guidelines and study lesson examples, drafted with private-sector employees

Source: OECD (2012), “PISA 2012 Results: Creative Problem Solving”, Students' skills in Tackling Real-Life Problems, pp. 124. Available from: <http://www.oecd.org/pisa/keyfindings/PISA-2012-results-volume-V.pdf>

Exhibit 12: Cross-disciplinary teaching in a UK school

ORGANISATION:
Cramlington Learning Village (UK)



ORGANISATION DESCRIPTION:

Secondary school

PROGRAM DESCRIPTION:

Larger classes with multiple teachers:

- For certain subjects, Cramlington uses two teachers for a 60-student class
- Increases flexibility of in-class schedule and allows teachers to split students into groups in any way that suits their needs (such as for parallel or differentiated instruction)
- Allows teachers to run cross-disciplinary sessions, such as an enquiry facilitated by a science and media teacher
- Result: teachers across many disciplines can build flexibility at no extra cost.

“The process of team teaching can also help to model and release the creative energies of collaboration, resulting in new and novel ways of orchestrating learning that are engaging to learners.”

Source: OECD (2015), *Schools for 21st Century Learners*

²⁷ Schleicher, A. (2015), *Schools for 21st-Century Learners: Strong Leaders, Confident Teachers, Innovative Approaches*, International Summit on the Teaching Profession, OECD Publishing

Exhibit 13: Entrepreneurship and innovation in a Victorian school

ORGANISATION:
Frankston High School



ORGANISATION DESCRIPTION:

Secondary school

PROGRAM DESCRIPTION:

Innovating in the 21st Century – a Year 9/10 course giving students 4 hours per week to build their own startup

- Students design and execute a project that contributes to the good of the school, local or global community

“Opportunities for current students and future school leavers is changing. Many of the students leaving schools do not have the skillset to fulfil positions in the future workplace or are aware of the changing opportunities for them.” “In developing a project, students will develop a range of skills including communication, technology development, curation and use of social media.”

“A huge focus of the subject is looking at the future of work and what are the skills required to be productive and happy in their future workplaces. We will look at team building, collaboration, productivity techniques and mindfulness”

Source: School course materials

Exhibit 14: Project-based learning in a UK school

ORGANISATION:
Matthew Moss High School (UK)



ORGANISATION DESCRIPTION:

Secondary school

PROGRAM DESCRIPTION:

My World curriculum – allowing Yr 7/8 student teams to work one day per week on a research project.

- Teachers first introduce a challenge, which can vary from launching an egg as high as possible and returning it to earth without breaking or responding to a natural disaster, to investigating family histories of migration.
- Students then gather information about the topic, write a research proposal, and, after the proposal is approved by the teacher, conduct the research throughout the school year.

“In the process, they [students] are free to organise their own research, while the teachers act as facilitators who present in-time lessons or suggest additional sources of knowledge.”

Source: OECD Educational Research and Innovation: Innovative Learning Environments

Developing teachers

While it is widely acknowledged that inquiry-based, collaborative and project-based learning are a very valuable way to develop enterprise skills, these teaching methods are challenging to develop in teachers. Leading international education academics have commented that:

“Inquiry approaches... are highly dependent on the knowledge and skills of the teachers engaged in trying to implement them... Teachers need time and a community to support their capacity to organise sustained project work. It takes significant pedagogical sophistication to manage extended projects in classrooms so as to maintain a focus on “doing with understanding” rather than “doing for the sake of doing.”²⁸

The requisite skills should be embedded as part of both initial teacher education and ongoing professional

development. In order to support professional development in this field, the RAND Corporation has suggested that activities need to be sustained and intensive, involve actual teaching materials, and be integrated into daily teaching work.²⁹ Some countries are offering online teaching resources and lesson plans to help teachers deliver best practice.

Partnering with employers

Enterprise skills can also be learned in work-based environments, such as work placements or internships. In fact, the OECD argues that these skills are often more effectively learned in workplace environments, further underscoring the importance of better integrating our education and employment systems.³⁰ Partnering with a local business on project-based learning for students, either in the classroom or in the workplace, has become a feature of leading educational institutions.

²⁸ Barron, B. and L. Darling-Hammond (2010), “Prospects and challenges for inquiry-based approaches to learning”, in H. Dumont, D. Istance and F. Benavides (eds.), *The Nature of Learning: Using Research to Inspire Practice*, Educational Research and Innovation, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264086487-en>.

²⁹ Rand Corporation (2012) “Teaching and Learning 21st Century Skills” Available at <http://asiasociety.org/files/rand-1012report.pdf>

³⁰ OECD (2014), *Skills Beyond School: Synthesis Report*, OECD Reviews of Vocational Education and Training, OECD Publishing

Exhibit 15: Business partnerships with university in Mexico

ORGANISATION:
Atelier of Ideas, Center for Studies on Design at Monterrey (Mexico)



ORGANISATION DESCRIPTION:
 University focused on innovation, design and business

PROGRAM DESCRIPTION:
 ‘Real-world’ project-based learning for students:

- College co-operates with enterprises and institutions that submit “real-world” projects that student teams complete – from brainstorming to final evaluation
- Instructors act as counsellors in this process
- Three major steps:
 - (1) Project design – coming up with a plan to bring the project to fruition;
 - (2) Collaborative work – working together to optimise the process and the outcomes; and
 - (3) Evaluation – by the teacher, peers, the individual student and the external agency that came up with the project proposal.

Exhibit 16: Business partnerships with school in Norway

ORGANISATION:
Breidablikk Lower Secondary School (Norway)



ORGANISATION DESCRIPTION:
 Secondary school

PROGRAM DESCRIPTION:
 ‘Building and Living’ – a 3-year practical building project:

- Students build houses on a 1:20 scale
- Students play the role of builder, gardener, electrician, bank employee, real estate agent and others
- To this end, the school co-operates with representatives of different businesses
- Students use the same digital tools that architects use, and houses are furnished with electricity and handmade furniture
- All designs must be environmentally sustainable

Source: OECD “Innovative Learning Environment Project”

Providing a clear picture with live labour market data

Finally, the digital age allows labour market data to be at the fingertips of young people who are deciding what training to undertake or what types of jobs applications to focus on. Rather than relying on anecdotal advice about which career path to pursue, live labour market data offers young people, parents and careers advisers an additional and valuable source of information. Using online job advertisements, we could build national tools for students that identify, in real time, what employers want, the biggest employers, the highest growth industries and the best paying work. Furthermore, it is now possible to disaggregate such data by geography so that information is locally relevant. As an example of the potential of live big data, Exhibit 18 lists the top 10 online-advertised occupations in three select towns or cities in Australia.



The labour market is dynamic and changing. We can harness technology and big data to help our education system understand this dynamism and better equip our young people.

Exhibit 17: Mapping emerging jobs and skill requirements in Europe

Organisation	Global Education Futures Forum
Organisation description	Atlas of Emerging Jobs
Program description	<ul style="list-style-type: none"> • Almanac of promising industries and jobs for the next 15-20 years • Designed to help young people think about what skills and expertise are required to succeed in future work, based on brief description of likely tasks required in the new occupations • 2500 Russian and global experts contributed to a research effort ‘Skill Foresight 2030’ to identify jobs in high demand in 25 key industries and map

Source: Global Education Futures, Atlas of Emerging Jobs

Exhibit 18: Advertised occupations, select Australian towns/cities

Top 10 advertised occupations, 6-digit level, select towns/cities



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