



## Draft Minutes of the 39<sup>th</sup> Board meeting

FutureNow, Creative and Leisure Industries Training Council 39<sup>th</sup> Board meeting held at Crown on Friday, August 24th 2018, 10am – 12 pm

### Attendees

Barry Felstead (Chair)	Crown, Australian Resorts
Ian Smith (Deputy Chair)	Advance Press, PIAA
Rob Thompson	WA Sports Federation
Natalie Jenkins	Black Swan State Theatre Company
Iain McDougall	Hospitality Group Training & Australian Hotels Association
George Coldham	Australian Computer Society
Jane King	John Curtin Gallery.
Matthew Thomas	Racing and Wagering WA
Stuart Halusz	Media, Entertainment, Arts Alliance (MEAA)
Warwick Lavis	Matilda Bay Restaurant, Restaurant and Catering WA

### Apologies

Seph Mckenna	Screenwest
Evan Hall	Tourism Council WA
Fran Kirby	Accor Hotels, State Training Board

### In attendance

Karen Ho	Department of Training and Workforce Development
Julie Hobbs	Chief Executive Officer, FutureNow

### Guest

Jim Walker	Chair, State Training Board
------------	-----------------------------

### Agenda

1. **Opening and Welcome**, The Chair opened the meeting at 10am and welcomed those present.
2. **Attendance and Apologies** were noted as listed above.
3. **Declaration of Interest**, Board members were directed to the Declaration of Interest register and invited to advise the CEO of current Board appointments. Iain McDougall was congratulated on his appointment as the West Australian representative to the Australian Industry Skills Committee (AISC).
4. **Guest Speaker, Jim Walker, Chair of the State Training Board.**

The Chair broke from the meeting to welcome Jim Walker and invited him to address the meeting. His remarks are summarised below.

Good governance is important for Training Councils, potential conflicts should be recorded. Jim Walker noted that FutureNow's governance and finances are acceptable.

Kathy Hoare, the Director of the Office of the State Training Board is the new contract manager for Training Councils. This role was transferred from State Workforce Planning at the Department of Training and Workforce Development (DTWD) on July 1, 2018. The link between Training Councils, the State Training Board and the Department is expected to be much stronger following this arrangement.

The State Training Board will be reviewing Training Council coverage in the development of the new Service Delivery Agreement (to commence in July 2019) both in terms of volume of industries covered and allocation of resources and the quality and depth of coverage. Regional coverage and Union representation have been identified as important factors for effective engagement. The State Training Board is aware that despite uniform funding there are discrepancies between the volume of industries that some Training Councils are expected to

cover in comparison to others and this imbalance will be reviewed. Planning for the new contract is expected to be finished prior to Christmas.

Barry Felstead noted that FutureNow has made significant savings as a result of the large cut to its funding. It is still drawing quite heavily on retained earnings to meet both the terms of the Service Delivery agreement and the performance standards required by the FutureNow Board.

Stuart Halusz asked where the State Training Board expects Training Councils to be in 5 years time. Jim Walker said the Labor Government and Minister Ellery are committed to Training Councils and are aware of the funding issues. Rob Thompson noted that the shrinking of the public sector and contraction of agencies has led to difficulties in quality engagement in general.

The State Training Board is also working closely with TAFE colleges and encourages Training Council Board members to engage with TAFE's where appropriate. Iain McDougall asked what the expectations of TAFE are within the context of delivery of qualifications to thin markets citing the example of Port Hedland dropping hospitality training. This has resulted in employers having to incur extra costs to train staff using a range of different options. Karen Ho responded on behalf of the Department saying that thin markets are important and TAFE colleges are expected to balance efficiencies from large volumes of training in order to service them.

Jim Walker described the current projects being undertaken by the State Training Board;

- Workforce development in the health sector
- Automation and the mining sector, including the use of the Certificate II in Technology to Vet for Secondary Schools Students programs.
- Training councils have contributed to both the **State Training Plan 2019-22** and the current **Technology and Innovation** project.

*Natalie Jenkins and Warwick Lavis joined the meeting at 10.20am.*

*Jim Walker left the meeting at 10.40am.*

**Action:** That the CEO prepare a letter to Jim Walker on behalf of the FutureNow board thanking him for his presentation and noting that the Board looks forward to receiving the new Service Delivery Agreement and information about future resourcing prior to the end of 2018.

*Proposed: Barry Felstead*

*Seconded: Iain McDougall*

5. Board member Industry updates (refer to summary below)
6. Approval of Minutes, 38th Meeting of the Board,

Board members noted two typographical errors in the minutes.

**Action:** That the Minutes of the 38th Meeting of the Board be approved as true and accurate minutes.

*Proposed: Barry Felstead*

*Seconded: Natalie Jenkins*

7. Matters Arising from the 37<sup>th</sup> and 38th Meeting of the Board

- **Action:** That when the a new contract or contract extension is received the Board accept it and advise the Department and the State Training Board that Training Council savings are being consistently drawn on to support the work. *Complete 24.8.18* .
- **Action:** That FutureNow Board meeting agendas be constructed to include Board member Industry updates as a standing item. *Complete*
- **Action:** That the CEO open a Declaration of Interest register for FutureNow Board members. *Complete.*
- **Action:** That the CEO thank Duncan Ord for his presentation on behalf of the FutureNow Board. *Complete June 1 2018.*

The matters arising above were noted.

- **Action:** CEO to follow up in regards to the strategy session on October 25<sup>th</sup> and report back to Board on August 24<sup>th</sup>. *Complete*

Board members discussed the strategy work proposal presented by *Step Beyond*. Members agreed that the cost of the proposal was acceptable for the scope of work and anticipated outcomes. The Chair expressed the view that in light of the work currently outlined in the Chair of the State Training Board's presentation it may be better

to postpone the session until the new Service Delivery Agreement arrangements have been outlined (anticipated prior to the end of 2018). Other Directors supported the timing of the October 25<sup>th</sup> session as an opportunity to take a proactive approach pending the development of the new agreement with the Department and the State Training Board. The CEO confirmed that it should be possible to liaise with the Director of the State Training Board leading up to the strategy session to ensure that current information was available to inform it. It was noted that *Step Beyond* produced the Department of Local Government, Sport and Cultural Industries 2018- 21 Strategic Plan. Board members indicated their interest in contributing to the session which would immediately precede the AGM. Natalie Jenkins invited all Directors to attend Black Swan Theatre Company's preview of *Xenides* following the AGM.

Action That the CEO engage *Step Beyond* for the strategy work and invite Board members to the session on October 25<sup>th</sup>, 2018.

*Proposed: Warwick Lavis*

*Seconded: Rob Thompson*

#### 8. Correspondence

Department of Mines, Industry Regulation and Safety Consumer Protection advising that changes to the FutureNow Constitution have been accepted. 15.6.18

- Anne Driscoll DTWD Director General letter of thanks, Training Forum Presentation. 16.6.18
- Paula Rogers, State Director of CEDA letter of thanks, *Future of Work* panel participation. 23.7.18
- Karen Purdy, Manager Vet Systems Policy DTWD, advice about DTWD funded places for secondary school students. 6.8.18

The Correspondence was noted.

#### 9. Financial statements: July 1<sup>st</sup> 2017 – June 30<sup>th</sup> 2018

**Action:** *That FutureNow's financial statements from July 1 2017 to June 30th 2018 be approved.*

*Proposed: Barry Felstead*

*Seconded: Matthew Thomas*

#### 10. Board membership fee review.

Rob Thompson spoke to the current practice of Board membership fees (set at \$490 + GST) which was established some years ago as part of a broader strategy that invited industry bodies to be members of FutureNow noting that the current Rules (Membership 5.4.4) allow Directors to exercise discretion about the level of fee, if any to be set and also that this can occur outside the context of an Annual General Meeting.

*Membership 5.4 (4)*

*The Board shall from time to time and no more than once annually determine the amount and manner, if any, of the subscription to be paid by each member.*

The discussion captured the varying levels of Board member organisation's capacity to pay and also queried the value proposition for membership noting the voluntary in time contribution already being made by Directors. The CEO confirmed that Board member invoices for 2018\_9 had not been generated pending the anticipated Board review.

**Action:** *That FutureNow 2018\_9 Board member fees be set at \$0.*

*Proposed: Natalie Jenkins*

*Seconded: George Coldham*

#### 11. Chief Executive Officer report

The Chief Executive Officer Report was noted.

#### 12. FutureNow Industry Manager reports

The Industry Manager Reports were noted.

#### 13. Other Business

The meeting closed at 12.15pm.

14. Remaining Board Meeting Dates 2018

- FutureNow Annual General Meeting, Thursday 25<sup>th</sup> October, 5.30 pm.
- Friday 7<sup>th</sup> December 2018, 10am – 12pm

Chairs Signature

.....

Date

.....

Board member industry updates

**Barry Felstead**

Crown Melbourne is going very well, Perth is the opposite with occupancy up but spending down approximately 20%. Western Australia is still struggling with the perceived high cost legacy from the resource construction boom and the current and projected pipeline of hotel projects is concerning in terms of the current difficulties in the sector. Crown is working hard not to undercut in the food and beverage areas and notes that its high end restaurants are still doing well.

Optus Stadium has not produced any extra business except if there is a concert as the public transport options mean that people tend to go home after sporting matches. The scheduling of matches on Sunday doesn't encourage interstate travellers, the matches need to be on Friday night or Saturday twilight games.

Believes that Minister Papalia's strategy of targeting direct flights from India, Japan and Shanghai is a good strategy.

**Warwick Lavis**

Destination Perth has to be the correct approach given the great distances within WA – not always clear to international visitors when they are making plans.

**Natalie Jenkins**

- Black Swan has experienced difficulties over the last 2 years as a result of the overall contraction in leisure spending. There is a commitment to discounting too heavily as low prices damage the sector in the long term. There is a constant need to balance accessible tickets with quality productions that remunerate all parts of the work force fairly.
- The performing arts patron experience needs to be part of a holistic experience that includes food and beverage, ticketing in house, the venue and all the front of house activity.
- Perth Theatre Trust arrangements to be taken in house by a not for profit entity.
- There is a Major Performing Arts review underway at a Federal level.
- The 'Me too' sexual misconduct fallout is leading to work relating to the creation of safe workplace codes at a National level

**Iain McDougall**

Hospitality response to the economic downturn is variable. Hotels at the high end are surviving but smaller outlets are struggling and many standalone operators are closing. This has a ricochet effect on suppliers all along the supply chain. In the trade areas supply is sitting at about 50% from where it was 3 years ago, particularly chefs. Ongoing resistance from TAFE colleges to pre- apprenticeships is not assisting with this. Well resourced enterprises like Crown (Crown college) and some of the new 5 star hotels continue to have an excellent attitude to training.

**Warwick Lavis**

The hospitality sector is still experiencing contraction and this has impacted on employment. Matilda Bay employed 24 chefs 3 years ago, this has now fallen to 15 and there are still issues recruiting quality candidates. Skilled migration changes have not assisted with the long term workforce pipeline for these occupations. A change in the training focus

is also impacting. The restaurant is situated in the western suburbs which is not a suitable catchment area for apprentices and the focus for that demographic is aspirational and tends to be directed to higher education occupations.

#### **Ian Smith**

The print sector has been significantly disrupted over the last 10 years, printed products on paper have declined by 50%. Capacity is very reduced, the Advance Press workforce has contracted from 60 to 40 employees. This in turn can impact on the industry's preparedness to take on apprentices. It means the quality of new employees need to be good and the training needs to be multi-faceted, across all areas of the business. Currently WA has a problem with no public training provider offering the trade qualifications and the industry preferred South Australian provider withdrawing from delivery in WA.

#### **Matthew Thomas**

Racing competes with other leisure sectors of the community for customer loyalty and discretionary spending. The industry which is a major employer including multiple occupations has high costs and is sustainable as a result of the TAB business activities. Discussion about privatisation has been underway for 4 years which presents challenges and there are ongoing changes around the regulation in betting.

Changing demographics and alternative occupational options are impacting on pipeline of jockey recruitments as the occupation becomes less attractive. However the sector is resilient and is currently negotiating complex change processes with reasonable success.

#### **George Coldham**

Recent salary survey data suggests ICT architect is currently the highest paid occupation in Australia. There is a projected 200,000 worker skill deficit in this area over the next 5 years. Data security legislation and cybersecurity concerns continue to drive this. From a training and upskilling point of view formal qualifications are less important than self learning and the internal drive to learn the systems and processes. There are substitute training products for this that people are able to access. The peak body, Australian Computer Society (ACS) is undergoing a governance review and their Annual publication "*Digital Pulse*" which looks at the state of the industry will have its WA launch in September.

#### **Jane King**

Visual arts and museums are traditionally non ticketed. The sector has concerns that the decision to charge an admission fee for the new museum will have a detrimental impact on community engagement and family visits. On a positive note membership of the Museum and Gallery Association is growing and an emerging professionals group has been established. Consumer and government expectations are driving the move to increased digitisation in the sector. The workforce is being challenged to find the skills to do this as well as the knowledge and expertise in copyright law.

Visual artists average earning is around \$18000 per annum. The National Association of Visual Artists (NAVA) is increasingly advocating to government, they will further advance these discussions at a National conference in Canberra in August. The sector is increasingly looking for diversified income streams – this can occur through being able to demonstrate benefit to other sectors, for example the link to Cultural Tourism.

#### **Rob Thompson**

Notes that there is an increased convergence between the sectors, people at the centre, whether professional or volunteer. The *National Sports Plan 2030* has been released by Federal Sports Minister Bridget McKenzie, references some of the matters currently be discussed within the sector

- 90% of sport is delivered by volunteers yet much of the attention is on the professional codes whose sustainability is already underpinned by major media companies
- There is ongoing work around the "Integrity of Sport" encompasses match fixing and betting, use of drugs in elite codes,
- Sport being increasingly positioned as a health lever – drawing on data related to the obesity epidemic, the sector sits within the Health department federally,
- Digitisation in sport is changing training and participation practices.

#### **Stuart Halusz**

The MEAA draft Cultural strategy to be released on September 11 will provide an insight into government plans for the performing arts sector. There is a paucity of work for actors, designers, and crew and this is leading to an exodus out of WA to work in other parts of Australia and out of the industry altogether. There are currently three feature films in pre- production and only three of the eighteen roles that have been cast have been given to local actors.

Employment practices that devalue the professionalism of actors include the use of a high number of interns on projects where industry professionals could be employed.

**Karen Ho DTWD**

- The value of International education to the WA economy has been demonstrated but currently WA enrolments sit behind other jurisdictions and work is continuing on various engagement strategies within Asia and India.
- New graduate streams are to be added to the Commonwealth Skilled Migration lists following the decision of the Commonwealth to allocate more places for graduates with Bachelors, Master and PHD programs.
- Progress has been made with the Commonwealth on the *Skilling Australia* funding agreement.
- The Jobs and Skills centres which encompass career advice, training and employment have been opened within TAFE colleges in metropolitan (5) and regional (8) WA.
- The DTWD is undergoing a Capability Review the report is due to be considered by government in the next two months.
- Sector wide IT system implementation is taking place across public training providers.

## Appendix 2

FutureNow Creative and Leisure Industries Training Council

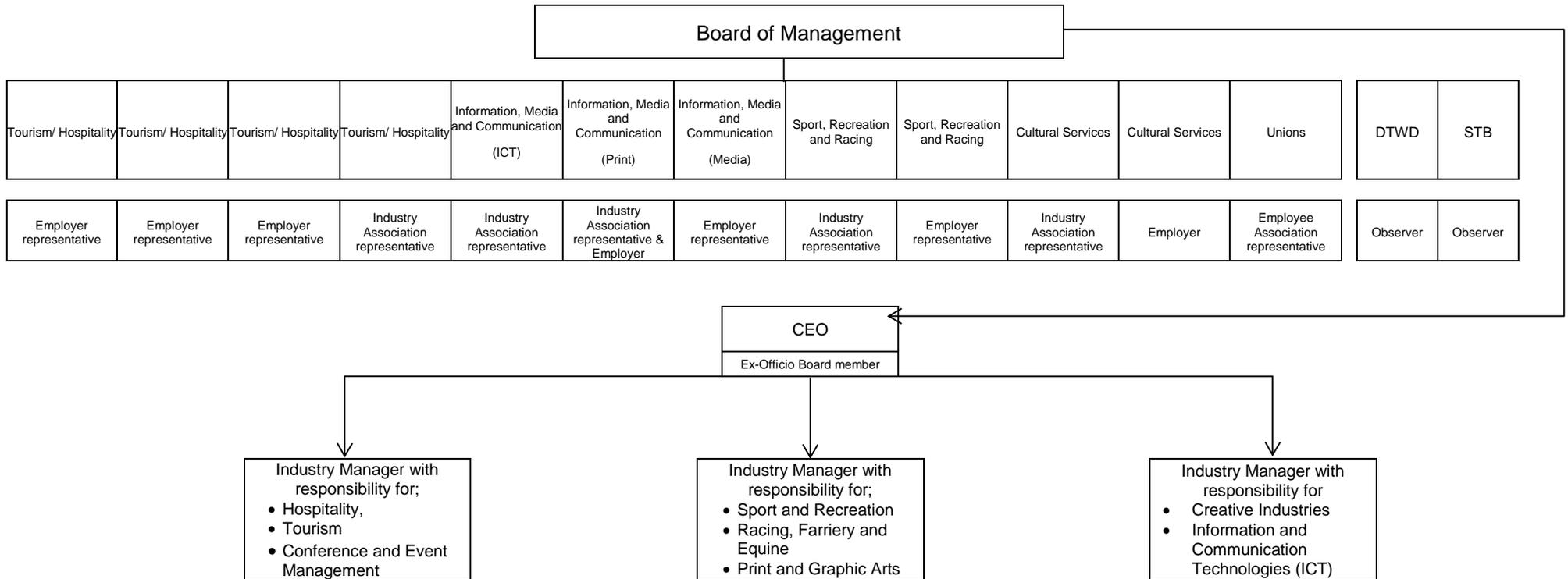
# Annual Business Plan

1 July 2018 to 30 June 2019

# CONTENTS

1. Industry Training Council Organisational Structure
2. Strategic Action Plan
3. Endorsement by Training Council Board of Management

# 1. Table 1: Industry Training Council Organisational Structure



Note: Industry Advisory Groups (IAG's) below are convened as required to provide industry consultation

Hospitality	Travel and Tourism	Events	ICT	Print and Graphic Arts	Screen and Creative Technologies	Media and Publishing	Performing Arts	Visual Arts and Design	Museums, Galleries, Libraries, Archives & Heritage	Sport and Recreation	Racing, Farriery and Equine
-------------	--------------------	--------	-----	------------------------	----------------------------------	----------------------	-----------------	------------------------	----------------------------------------------------	----------------------	-----------------------------

## 2. Strategic Action Plan

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<p><b>1. WORKFORCE AND OCCUPATIONAL PRIORITIES</b></p> <p>Provide industry intelligence and data on workforce and occupational priorities to inform the:</p> <ul style="list-style-type: none"> <li>State Training Board's (the Board) Occupational Profiles for State Training Plan;</li> <li>Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL); Western Australian Skilled Migration Occupation List (WASMOL);</li> </ul>	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>Conduct research into workforce and occupational priorities within its industry areas to provide new data and validate existing data to inform the State Training Plan and the SPOL.</li> <li>Ensure information is appropriately referenced, of a publishable standard, and is validated with industry stakeholders and through other data sources including published research findings and engagement in industry forums.</li> <li>Continue to conduct industry consultation with employers, peak bodies and unions, to identify current and projected skill shortages and industry workforce priorities. The following Industry Advisory Networks will have input into the work. <ul style="list-style-type: none"> <li>Galleries, Museums and Libraries</li> <li>Visual Arts &amp; Design</li> <li>Performing Arts</li> <li>Screen and Creative Technologies</li> <li>Print and Graphic Arts</li> <li>ICT</li> <li>Hospitality</li> <li>Travel and Tourism</li> <li>Conference and Event Management</li> </ul> </li> </ul>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>Industry intelligence is collected and incorporated appropriately in FutureNow submissions to the State Training Plan and the SPOL.</li> <li>Industry intelligence is accurate, accessible, timely and strategically gathered to maximise positive impact on the relevant sectors.</li> <li>A broad and expanded industry network will improve accuracy, support the development of a rigorous nuanced narrative.</li> </ul>	<p>Iterative and as required to meet the Department and The Board's timeframes.</p> <p>SPOL data will be submitted to the Department in March, 2019.</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<ul style="list-style-type: none"> <li>○ Sport and Recreation</li> <li>○ Racing, Farriery and Equine</li> <li>○ Media and Publishing</li> </ul>		
<p>WORKFORCE AND OCCUPATIONAL PRIORITIES: SPOL and the State Training Plan</p>	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>• Ensure industry engagement is maintained in relation to the following State Priority Occupations, published in September 2018, in particular where potential industry growth or workforce shortages have been flagged:</li> </ul>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Accurate industry intelligence relating to areas of highest workforce pressure.</li> </ul>	<p>SPOL advice, prior to March 2019 and ongoing.</p>
<p>Cultural &amp; Creative Sectors:</p>	<p><u>Library Technician</u></p> <ul style="list-style-type: none"> <li>• FutureNow will advocate for the development of appropriate VET qualifications at the national level.</li> <li>• FutureNow's Creative Industries Industry Manager has been appointed to the Project Working Group for a <i>BSB Business Services</i> project to review <i>Information Management</i> qualifications and will represent the needs of the broader WA sector through this project in this timeframe.</li> <li>• FutureNow will contribute to a project to review <i>CUA Creative Arts and Culture</i> qualifications in the <i>Arts Administration</i> area, which may also service these sectors.</li> </ul>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Appropriate qualifications will be made available to service the Galleries, Museums, Archives, Heritage and Library sectors.</li> <li>• Library and Information qualifications will incorporate a broader set of skills as per industry preference.</li> <li>• Arts Administration qualifications will include a broader set of skills to reflect the diverse workforce that could benefit from access to these qualifications.</li> </ul>	<p>As above</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
		<p><u>Context:</u>            FutureNow submitted a SPOL response against ANZSCO 399312 <i>Library Technician</i> to describe ongoing skills gaps issues facing the Museums and Galleries sectors. There is no VET training or higher-level qualifications available to service these sectors in WA. FutureNow worked closely with the sector to identify skills gaps and training needs in 2017-18, and will continue through 2018-19 to seek the development of appropriate VET qualifications at the national level.</p>	
<p>WORKFORCE AND OCCUPATIONAL PRIORITIES: SPOL and the State Training Plan</p>	<p><u>Author / Book or Script Editor / Copywriter / Newspaper or Periodical Editor / Print Journalist / Technical Writer</u></p> <ul style="list-style-type: none"> <li>• FutureNow will trial a new Industry Advisory Network for the Media and Publishing sectors, to provide a focus on industries working primarily with written content.</li> <li>• FutureNow CEO will continue to work through the Project Working Group for new qualifications <i>Certificate IV and Diploma of Professional Writing and Editing</i>, intended to be added to the <i>CUA Creative Arts and Culture</i> training package.</li> <li>• FutureNow will provide a submission to the 2019 SPOL that captures industry intelligence about the ongoing needs of sectors that draw on writing skills, as well as the broader workforce skills issue.</li> </ul>	<p><u>Outcomes:</u></p> <ul style="list-style-type: none"> <li>• Better industry intelligence for these sectors.</li> <li>• Accessible training for Western Australians seeking careers in the Media and Publishing sectors and accessible skill sets for the very broad set of sectors and workers that require increasingly sophisticated written communication skills.</li> <li>• Accurate and timely intelligence to support industry development in WA.</li> </ul>	<p>As above</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
		<p><u>Context:</u>            FutureNow submitted a response against a selection of ANZSCOs with outcomes for professional writers to highlight a growing need within the diversified economy for workers across a broad selection of occupations to develop more sophisticated written communication skills.</p>	
Information & Communications Technology Sector:	<p><u>ICT Security Specialist: Critical Occupation</u></p> <ul style="list-style-type: none"> <li>• FutureNow's ICT Industry Manager has been appointed to the newly formed South Metropolitan TAFE Cybersecurity Industry Advisory Group and will work through this group to gather industry intelligence and promote engagement with FutureNow's work</li> <li>• FutureNow will continue to work through an expanded ICT Industry Advisory Network to gather detailed intelligence around current trends for this occupation, which is predicted to experience significantly increased demand in the short-to-medium term.</li> </ul> <p><u>Developer Programmer / Software Engineer</u></p> <ul style="list-style-type: none"> <li>• FutureNow will work with the Australian Information Industry Association and Start-Up WA to seek new sources of quantitative data.</li> </ul>	<p><u>Outcomes:</u></p> <ul style="list-style-type: none"> <li>• Expanded access to industry networks and improved intelligence around the position of VET education in supporting this critical occupation.</li> <li>• Timely, accurate industry intelligence to inform the State Training Board and DTWD's strategies and planning around this critical occupation.</li> <li>• More rigorous data to inform and support the quantitative sector narrative around the potential of the tech start-up sector.</li> </ul>	<p>As above</p> <p>As above</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<ul style="list-style-type: none"> <li>FutureNow will expand existing networks and include representatives of the Tech start-up sector in its ICT Industry Advisory Network to support evidence gathering</li> </ul> <p><u>Network Analyst / ICT Project Manager / Network Administrator</u></p> <ul style="list-style-type: none"> <li>FutureNow will maintain a watching brief on these additional ANZSCOs which have been allocated to State Priority 2 on the 2018 SPOL</li> <li>FutureNow's ICT Industry Manager will continue to host Industry Advisory Networks for ICT and Creative Technologies, and sit on external Advisory Groups in IT, Creative Tech and Cybersecurity.</li> </ul>	<ul style="list-style-type: none"> <li>Better industry intelligence and appropriate engagement with the relevant sectors.</li> </ul> <p><u>Context:</u> In 2018 FutureNow reported against <i>Developer Programmer</i> and <i>Software Engineer</i> ANZSCOs to capture the narrative around lost potential from a lack of support for the Tech start-up sector. Following liaison with DTWD's Employment and Labour Market Analysis team, FutureNow is working to capture nuanced qualitative data to support a more sophisticated understanding of the levers that drive growth in this sector, which is crucially not characterised by a traditional employer / employee business structure.</p> <ul style="list-style-type: none"> <li>Timely, accurate industry intelligence on these ICT related occupations which are experiencing ongoing, significant demand.</li> <li>Further development of ICT networks and a broader narrative around industry issues and opportunities in 2018-19.</li> </ul>	As above

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<p>WORKFORCE AND OCCUPATIONAL PRIORITIES: SPOL and the State Training Plan</p> <p>Racing, Farriery and Equine Sector</p>	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>• monitor any labour shortages and unmet demand being experienced amongst occupations servicing the racing, farriery and equine industries, notably horse trainers and farriers.</li> <li>• monitor the following key workforce priorities: <ul style="list-style-type: none"> <li>○ potential labour and skill shortages</li> <li>○ foundation level equine and racing qualifications</li> </ul> </li> <li>• work with the industry to investigate strategies to increase the pipeline of suitable industry entrants.</li> <li>• continue to monitor the impact of skilled migration reforms on industry.</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• Focus is maintained on the sector's two priority occupations.</li> <li>• The Department continues its funding support for training in these occupations.</li> <li>• Preliminary strategies are developed to start to address the issue of an inadequate pipeline of potential employees for the sector.</li> </ul> <p><u>Context</u></p> <p>FutureNow will continue to monitor any labour shortages and unmet demand being experienced amongst occupations servicing the racing and equine industries. Two occupations are listed on the current (2018) SPOL:</p> <ul style="list-style-type: none"> <li>• Horse Trainers are a State Priority 2</li> <li>• Farriers are a State Priority 2</li> </ul> <p>In addition, FutureNow will monitor the following key workforce priorities for the racing and farriery sectors:</p> <ul style="list-style-type: none"> <li>• potential labour and skill shortages, in the face of an ageing workforce and the need to attract new employees</li> <li>• foundation level equine and racing qualifications, including skill sets such as a trackrider skill set, to address the problem of potential new workers no longer having a public provider offering entry level training.</li> </ul> <p>The industry has identified a problem with the lack of a pipeline of suitable new industry entrants, as well as the potential for skilled migration reforms to have an adverse impact.</p> <p>Monitoring of these issues will occur through FutureNow's Racing, Farriery and Equine Industry Advisory Network and through other one-on-one consultation.</p>	<p>Racing, Farriery and Equine IANs:</p> <ul style="list-style-type: none"> <li>• September 2018</li> <li>• March 2019</li> </ul> <p>May 2019</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
Sport and Recreation	<p>FutureNow will work with the industry parties to:</p> <ul style="list-style-type: none"> <li>• monitor labour and skills shortages in the Sport and Recreation sector, including Outdoor Recreation, and identify those occupations where the shortages are seen as critical</li> <li>• develop plans to address specific shortages, including developing representations for their inclusion on the 2019 SPOL where appropriate</li> <li>• monitor relevant training delivery</li> <li>• ensure WA industry input to Training Package review projects.</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• Occupations with skills and/or labour shortages are identified, and work done with the industry to address these issues where possible.</li> </ul> <p><u>Context</u></p> <p>The expanding adventure tourism sector is increasingly requiring employee skills development at the higher Certificate III and IV level qualifications. The sector's growth has brought labour and skills issues that need to be addressed. Trained, qualified and experienced staff are needed to meet not only the increasing outdoor recreation activity but also the changing demands placed on the workforce. However there remains a shortage of Training Providers delivering these certificates. The occupation of Outdoor Adventure Instructor is listed on the current (2018) SPOL as "Other identified occupations".</p> <p>In addition, regional community recreation/aquatics centres report problems in attracting suitably qualified staff, and this may impact on their range of services and even opening times. Current and future training needs for the sector in major centres and in the regions relate to the ability of the sector workforce to engage and either train or provide services to marginal and special needs groups.</p> <p>The quality of coaching of children at the community sport level has been identified as a problem, and there needs to be a greater emphasis on coaches becoming qualified. This includes volunteers, who equally need have the skills to provide positive experiences in safe environments.</p>	June 2019
Deliverables	Actions	Expected Outcomes / Commentary	Timelines
WORKFORCE AND OCCUPATIONAL PRIORITIES: SPOL and	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>• ensure engagement is maintained with employers, peak bodies, and training</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• Occupations that are integral to the successful implementation of the State Government's</li> </ul>	March 2019

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<p>the State Training Plan</p> <p>Tourism and Hospitality</p>	<p>providers for the retention and inclusion on SPOL of the following occupations facing labour or skills shortages that are critical to Western Australia's Tourism, Hospitality and Events sectors:</p> <ul style="list-style-type: none"> <li>○ Chef</li> <li>○ Hotel or motel manager</li> <li>○ Pastrycook</li> <li>○ Café or restaurant manager</li> <li>○ Hotel service manager</li> </ul> <ul style="list-style-type: none"> <li>• Hospitality, Tourism and Events Sector</li> <li>• Through FutureNow's Hospitality and Tourism IAGs FutureNow will continue to work with employers, peak bodies, and training providers for the retention and inclusion on SPOL of; <ul style="list-style-type: none"> <li>• Chef</li> <li>• Hotel or motel manager</li> <li>Pastrycook</li> <li>Café or restaurant manager</li> <li>Hotel service manager</li> </ul> </li> </ul> <ul style="list-style-type: none"> <li>• consult with employers and training providers to determine in which streams/ sectors of the hospitality industry students are training.</li> </ul>	<p>Tourism Two-year Action Plan are retained on the SPOL.</p> <ul style="list-style-type: none"> <li>• Numbers in training in cookery, hospitality, catering and patisserie increase, and the particularly high attrition rate of the commercial cookery apprenticeship begins to ease.</li> </ul> <p><u>Context</u></p> <ul style="list-style-type: none"> <li>• Hospitality occupations are growing in demand due to staffing requirements from newly developed hospitality venues.</li> <li>• Hospitality occupations have been impacted upon by legislative changes to migration pathways in the Temporary Skilled Shortage (TSS) visa program: <ul style="list-style-type: none"> <li>○ Hotel or Motel Managers, Café or Restaurant Managers, Cooks and Pastrycooks are included on the short-term stream of the TSS. They can work in Australia for maximum two years.</li> <li>○ Chef has been included on medium to long term TSS list. They are permitted to work in Australia for four years and can access permanent residency. There is however a global shortage of chefs, which in addition to falling commencements and high attrition rates of the commercial cookery apprenticeship in WA, continues to be an industry challenge.</li> </ul> </li> </ul> <p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• an accurate reflection of where education and training delivery is supplying skilled workers to the hospitality industry to understand where gaps may be present.</li> </ul> <p><u>Context</u></p> <ul style="list-style-type: none"> <li>• Hospitality qualifications (not cookery) broadly address training for a range of occupations for workers in hotels, motels, cafés, restaurants, casinos, bars, clubs and pubs. It is currently not</li> </ul>	<p>February 2019</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<ul style="list-style-type: none"> <li>through one-on-one consultation FutureNow will examine the labour force requirements of hotels (new and established) in the greater Perth area.</li> </ul>	<p>possible to differentiate which stream students are undertaking.</p> <p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>This will provide a list of the range of occupations that service the hotels sub-sector and will offer insights into jobs that are difficult to fill to inform training needs and strategies that will improve the pipeline of skilled workers.</li> </ul>	<p>January 2019</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<p><b>2. APPRENTICESHIPS AND TRAINEESHIPS</b></p> <p>Provide industry advice to the Board and the Department to inform the establishment and variation of apprenticeships and traineeships.</p>	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>• Consult with industry, Peak Bodies, Unions, Industry Advisory Groups, RTO's, the Board and the Department to: <ul style="list-style-type: none"> <li>○ Deliver timely advice on the establishment and variation of apprenticeships and traineeships, based on and in accordance with the amended Vocational Education &amp; Training Act (VET 1996) and in accordance with the Guidelines for the Establishment and Variation of Apprenticeships;</li> <li>○ Provide policy advice on apprenticeships and traineeships when requested by the Department.</li> <li>○ Provide feedback to the Board regarding any factors that may have impacted on the take up of recently established Apprenticeships and Traineeships.</li> <li>○ Monitor changes to qualifications that may impact on existing and new EVACs following the endorsement of new Training Packages</li> </ul> </li> <li>• Promote the available range of apprenticeships and traineeship options to industry and advise industry of changes to training in their industry sectors.</li> <li>• Work with industry, the Department and RTOs to identify opportunities for work based training at all AQF levels.</li> </ul>	<p><u>Outcomes:</u></p> <ul style="list-style-type: none"> <li>• Rigorous, timely, industry-informed information provided to the State Training Board in accordance with the appropriate instrument.</li> <li>• Access to apprenticeship pathways is maximised, providing appropriate career pathways for students and graduates, and supporting industry skills needs.</li> <li>• Access to realistic work experience for students is maximised and industry skills needs are supported.</li> </ul>	<p>As required and in the case of full EVAC applications, within 6 weeks of the formal request from the Board.</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
APPRENTICESHIPS AND TRAINEESHIPS  ICT Sector	<ul style="list-style-type: none"> <li>FutureNow will consult with WA industry to gauge interest in adopting a traineeship model of delivery for the Certificate IV Cybersecurity recently added to scope by both North and South Metropolitan TAFEs.</li> </ul>	<ul style="list-style-type: none"> <li>Industry skills needs for this critical occupation will be supported and accessibility of pathways into cyber security careers will be maximised.</li> </ul>	December 2018
Print and Graphic Arts	FutureNow will work with the industry to: <ul style="list-style-type: none"> <li>investigate initiatives for attracting young people into print and graphic arts occupations</li> <li>develop and recommend a strategy to ensure suitable training provision is available to WA employers and new entrants</li> <li>advocate to the State Government for the provision of thin market apprenticeship training in WA.</li> </ul>	<u>Outcomes</u> <ul style="list-style-type: none"> <li>A Pathways document showing career paths and qualifications in the industry is completed and disseminated.</li> <li>A position paper on the sector and training provision in thin markets is completed for discussion with DTWD.</li> </ul> <u>Context</u> FutureNow's Print and Graphic Arts Industry Advisory Network advises that there is no suitable pipeline of younger, new employees coming in to the industry. This is caused by a number of factors, principally poor knowledge of the industry and its career paths in the younger labour market, and the need for the industry to better market itself. In addition, there is now a training vacuum following the previous withdrawal of the local provider (North Metropolitan TAFE) from delivery and the more recent withdrawal of TAFE SA from the WA market.	December 2018  November 2018
Racing, Farriery and Equine Sector	FutureNow will: <ul style="list-style-type: none"> <li>monitor jockey and apprentice jockey numbers in light of potential shortages identified by the industry</li> <li>develop a strategy to promote the Farriery apprenticeship to employers and</li> </ul>	<u>Outcomes</u> <ul style="list-style-type: none"> <li>Project work is undertaken with the industry and Master Farriers Association to promote farriery apprenticeships and work in the industry.</li> </ul>	May 2019

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<p>prospective new apprentices to ensure the continued supply of qualified farriers</p> <ul style="list-style-type: none"> <li>liaise with the industry and industry bodies to monitor the new Certificate III in Equine Hoof Care and Certificate IV in Farriery when delivery commences, to analyse enrolment numbers and industry response to the new qualifications</li> <li>advocate to the State Government on the issue of thin market apprenticeship training.</li> </ul>		
<b>APPRENTICESHIPS AND TRAINEESHIPS</b> Tourism and Hospitality	FutureNow will: <ul style="list-style-type: none"> <li>communicate through communication channels including meetings to employers and RTOs that new entrant trainees are eligible to progress into a higher-level qualification with the same employer within three months of completing the first traineeship.</li> </ul>	<u>Outcomes</u> <ul style="list-style-type: none"> <li>stakeholders are informed that the pathway for workers wishing to undertake a Certificate IV in Hospitality is possible under certain conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing</li> </ul>
	<ul style="list-style-type: none"> <li>continue to promote the Certificate II in Kitchen Operations as a Pre-Apprenticeship pathway for commercial cookery through ongoing dissemination of a fact sheet produced to highlight the delivery methods available for this qualification.</li> </ul>	<u>Outcomes</u> <ul style="list-style-type: none"> <li>commencements of the commercial cookery apprenticeship will increase as a result of greater use of the Certificate II level pre-apprenticeship pathway.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing</li> </ul>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<b>3. VOCATIONAL EDUCATION AND TRAINING (VET) FOR SECONDARY STUDENTS</b> Provide industry leadership and support to improve school and industry engagement.	FutureNow will: <ul style="list-style-type: none"> <li>Conduct industry consultation and provide advice:               <ul style="list-style-type: none"> <li>regarding the suitability of qualifications on the VET Qualifications Register for Secondary Students and</li> <li>into the development of strategic policy in relation to Vocational Education and</li> </ul> </li> </ul>	<u>Outcomes:</u> <ul style="list-style-type: none"> <li>Vet Qualifications Register for Secondary Students is informed by industry and reflects industry preference.</li> </ul>	As appropriate in relation to the VET Qualifications Register for Secondary Students review in November 2018.

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<p>Training (VET) and VET for Secondary Students in WA</p> <ul style="list-style-type: none"> <li>• Contribute to updates of the VET Qualifications Register for Secondary Students and through its communication channels: <ul style="list-style-type: none"> <li>○ promote the register as industry's preferred model</li> <li>○ provide current Vet for Secondary Students information to Training Providers.</li> <li>○ promote Vet for Secondary Students achievement in WA through National Training and Industry Awards programs.</li> </ul> </li> <li>• As opportunities arise participate in Steering committees and Reference groups providing industry input into Vet for Secondary Students related issues.</li> </ul>	<ul style="list-style-type: none"> <li>• Vet Qualifications Register for Secondary Students is accessible and supports secondary students with appropriate pathways to industry relevant occupations.</li> <li>• Industry advice relating to the Vet Qualifications Register for Secondary Students is accessible and remains current.</li> </ul>	
Sport and Recreation	FutureNow will continue to monitor the delivery of, and enrolments in, Certificate III and IV in Fitness qualifications.	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• Industry's position clarified and reiterated to DTWD, and repeated in the updated Register.</li> </ul> <p><u>Context</u></p> <p>The Certificates III and IV in Fitness are currently being delivered within a school environment notwithstanding industry recommendations against school delivery, as outlined in the VET Qualifications Register for Secondary Students.</p>	November 2018
Hospitality	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>• Work with the Apprenticeship Office and an RTO with regards to the delivery of Certificate III in Hospitality as a School-</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• Industry's position will be relayed to the Apprenticeship Office. The feedback will inform</li> </ul>	November 2018

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<p>based Traineeship where the school is the employer.</p> <ul style="list-style-type: none"> <li>• Consult with employers to determine Industry's position about the appropriateness of the training contract and extent to which students have a realistic workplace experience through this delivery pathway.</li> </ul>	<p>the Apprenticeship Office's decision the delivery of this traineeship pathway.</p>	

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<p><b>4. TRAINING PACKAGES</b> Provide industry advice to the Department regarding the development, review, endorsement, and implementation of Training Packages.</p>	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>• Undertake appropriate consultation to inform advice about the development, review and endorsement of Training Packages with relevant stakeholders including Industry, peak bodies, Skills Service Organisations, Industry Reference Committees, the Australian Industry Skills Committee, The Department of Training and Workforce Development and The State Training Board.</li> <li>• Assist with communication, implementation and roll out of newly endorsed qualifications through communication channels, Industry Advisory Networks and RTO Forums.</li> <li>• Provide current, broadly researched industry advice relating to Training Package development to The Department in a timely manner.</li> <li>• FutureNow will continue to represent industry views in Training Package development through the CEO's representation on Industry Reference Committees for the Cultural &amp; Creative and Print and Graphic Arts sectors.</li> <li>• Service Skills Organisations with carriage of FutureNow's industry sectors will be invited to IAN meetings to provide Training Package updates.</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>• consultation forums are arranged and WA industry views are considered in Training Package reviews</li> <li>• stakeholder views are provided to the Department in a timely manner for each step in the Training Package review processes</li> <li>• RTOs receive timely advice on developments as needed.</li> <li>• Nominal Hours reviews, Industry Skills Forecasts, Cases for Change and Cases for Endorsement are informed by current, rigorous industry information.</li> <li>• FutureNow maintains a significant profile at the national level and Western Australian industry's voice is appropriately represented in national strategic reviews.</li> <li>• Industry gains access to the national narrative and an appropriate understanding of relevant training package work.</li> </ul>	<p>Ongoing as projects progress and as Training Packages are published on <a href="http://www.training.gov.au">www.training.gov.au</a></p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
Information Communications Technology	FutureNow will contribute to the following projects during the reporting period, as outlined in the current Industry Skills Forecast: <ul style="list-style-type: none"> <li>• <i>Big Data</i> cross-sectoral review</li> <li>• <i>Cybersecurity</i> cross-sectoral review</li> <li>• <i>Getting a Job in IT</i> qualifications review</li> </ul>	Outcomes: <ul style="list-style-type: none"> <li>• Current Western Australian industry's position is accurately captured and articulated, ensuring industry-relevant content in nationally endorsed training product relating to FutureNow industry coverage.</li> </ul>	July 2019
Business Services	FutureNow will contribute to the following projects during the reporting period, as outlined in the current Industry Skills Forecast.: <ul style="list-style-type: none"> <li>• <i>Library and Information Services</i> qualifications review</li> </ul>	<ul style="list-style-type: none"> <li>• Current Western Australian industry's position is accurately captured and articulated, ensuring industry-relevant content in nationally endorsed training product relating to FutureNow industry coverage.</li> </ul>	October 2019
Creative Arts and Culture	FutureNow will contribute to the following projects during the reporting period, as outlined in the current Industry Skills Forecast: <ul style="list-style-type: none"> <li>• <i>Arts Administration</i> qualifications review</li> <li>• <i>Arts Health</i> review</li> <li>• <i>Mental Wellbeing in the Arts</i> review</li> <li>• <i>Screen, Media and Broadcasting</i> qualifications review</li> <li>• <i>Music</i> qualifications review</li> <li>• <i>Dance and Musical Theatre</i> qualifications review</li> <li>• <i>Professional Writing and Editing</i> qualifications development</li> </ul>	<ul style="list-style-type: none"> <li>• Current Western Australian industry's position is accurately captured and articulated, ensuring industry-relevant content in nationally endorsed training product relating to FutureNow industry coverage.</li> </ul>	Various, to July 2019

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
Printing and Graphic Arts	<p>FutureNow will undertake consultation around the needs of WA industry in the following Training Package projects which are current for 2018/19:</p> <p><b>Industry Knowledge and Employability Skills:</b> The Printing and Graphic Arts IRC is updating components in the Printing and Graphic Arts Training Package relating to industry knowledge and employability skills.</p>	<ul style="list-style-type: none"> <li>consultation forums are arranged and WA industry views are considered in Training Package reviews</li> <li>stakeholder views are provided to the Department in a timely manner for each step in the Training Package review processes</li> <li>RTOs receive timely advice on developments as needed.</li> </ul>	May 2019
Racing, Farriery and Equine	<p><b>Racing Transition:</b> The Racing IRC is updating existing components of the Racing Training Package to align with the 2012 Standards for Training Packages. As part of these activities the Racing IRC will be updating existing and developing new components related to equine skills in response to the ASQA Strategic Review of Training in Equine Programs in Australia.</p> <p><b>Racing and Breeding - Thoroughbred Breeding Skills:</b> The Racing and Breeding IRC is developing units required for the breeding of thoroughbreds.</p> <p><b>Racing and Breeding - Greyhound Health Assistance:</b> The Racing and Breeding IRC is developing units for the provision of health care to greyhounds by non-veterinarians.</p> <p><b>Racing and Breeding - Retraining and Re-educating Racing Animals:</b> The Racing and Breeding IRC is developing units for the retraining and re-educating of ex-racing animals for safe retirement.</p> <p><b>Animal Care and Management - Large Animal Rescue:</b> The Animal Care and Management IRC is reviewing components of the Animal Care and Management Training Package relating to the skills needed to undertake large animal rescue,</p>	<ul style="list-style-type: none"> <li>consultation forums are arranged and WA industry views are considered in Training Package reviews</li> <li>stakeholder views are provided to the Department in a timely manner for each step in the Training Package review processes</li> <li>RTOs receive timely advice on developments as needed.</li> </ul>	Various

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<p>including fire and rescue, veterinary operations, farming and animal transport.</p> <p><b>Animal Care and Management – Farriers:</b> The Animal Care and Management IRC is updating existing components of the Animal Care and Management Training Package relating to farriers, to align with changed industry practice and job roles.</p> <p><b>Animal Care and Management - Horse Education:</b> The Animal Care and Management IRC is reviewing components of the Animal Care and Management Training Package relating to a new qualification in horse education, focused on the reduction of risk for young horse educators breaking in horses.</p>		
Sport and Recreation	<p><b>Fitness Training:</b> The Sport and Recreation IRC is updating the Fitness training package products in the SIS training package to better align qualifications with key job roles in the sector and address industry growth and credibility. The updates will improve the standards of professionalism, customer care and service, and strengthen job roles within the fitness industry.</p> <p><b>Aquatic Instructor Training:</b> The Sport and Recreation IRC is updating the Aquatic Instructor training package products in the SIS training package relating to job roles in the aquatics industry and establish a skill set to align with the job role of aqua instructor due to ongoing and increasing demand and difficulties in recruiting qualified staff.</p> <p><b>Sport, Fitness and Recreation Transition and Update:</b> The Sport and Recreation IRC is transitioning the Sport, Fitness and Recreation Training Package to the 2012 Standards for Training</p>	<ul style="list-style-type: none"> <li>• consultation forums are arranged and WA industry views are considered in Training Package reviews</li> <li>• stakeholder views are provided to the Department in a timely manner for each step in the Training Package review processes</li> <li>• RTOs receive timely advice on developments as needed.</li> </ul>	Various

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	Packages and updating components relating to Sport Coaching, Sport Trainer, Sport Career Oriented, Sport Career Oriented Participation & Sport Development.		
Tourism and Hospitality	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>contribute towards work associated with the Tourism, Travel and Hospitality IRC's update of components in the SIT Tourism, Travel and Hospitality Training Package through industry consultation.</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>relevant information will be distributed to stakeholders about the update of components related to commercial cookery, Asian cookery, patisserie and catering operations to address industry identified skills gaps in these areas.</li> <li>Industry and RTOs will be informed of consultation relating to responsible service of alcohol and the safe handling of food.</li> </ul>	<ul style="list-style-type: none"> <li>August 2019</li> <li>ongoing</li> </ul>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
<p><b>5. OTHER</b> Provide other advice to the Board and Department as specified.</p>	<p>FutureNow will:</p> <ul style="list-style-type: none"> <li>Work with the Board and the Department to identify and undertake strategic projects that contribute to: <ul style="list-style-type: none"> <li>the training and workforce agenda as identified through the Department and Board's strategic planning.</li> <li>Board projects and research (these may be drawn from the Board's 2019-22 State Training Plan).</li> </ul> </li> <li>Work with industry to identify strategic project work to support workforce planning</li> <li>Develop a series of industry snapshots, position papers and case studies to support industry workforce planning.</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>Agreed projects are progressed with appropriate industry input, are accurate and timely and contribute to the Board's strategic work.</li> <li>Industry intelligence is applied in a practical and strategic manner to achieve outcomes for the relevant sectors.</li> <li>A strategic narrative is developed to support industry workforce targets and improve broad</li> </ul>	<p>As required according to negotiated timelines.</p> <p>Ongoing</p> <p>Various, to December 2019</p>

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	<ul style="list-style-type: none"> <li>• Refresh its communications and engagement strategy, including:               <ul style="list-style-type: none"> <li>○ Developing an expanded Industry Advisory Network.</li> <li>○ Reviewing networks for diversity and inclusion</li> <li>○ Reviewing networks for sub-sector or skills and knowledge gaps</li> <li>○ Progressing engagement strategies for Regional, Local Government, Higher Education and sector specific stakeholders</li> <li>○ Establishing new Industry Advisory Networks or expanding networks to incorporate or bring a more rigorous focus to sectors including Heritage and Archives, Media and Publishing, and Creative Technologies.</li> </ul> </li> </ul>	<p>understanding of industry, issues, skills and labour gaps and opportunities.</p> <ul style="list-style-type: none"> <li>• Sector reach is improved, and accuracy of intelligence is maximised.</li> </ul> <p><u>Context:</u> The Heritage and Archives sectors are distinct from Galleries, Museums and Libraries, though with considerable skills and outputs crossover. The sectors have not had discrete attention to date and FutureNow will work with them to develop an agreed narrative around sector skills and labour needs for the future. Significant growing demand for technical skills have been identified, especially with relation to digitisation and cybersecurity. Ensuring the sector has access to a skilled workforce will underpin its ability to contribute to the Tourism agenda, preserve the state's shared heritage and ensure the safe keeping of public records.</p>	Various, to September 2019
	Consult with relevant stakeholders to provide advice required for the purposes of addressing Ministerial briefings, Parliamentary Questions on		As required

Deliverables	Actions	Expected Outcomes / Commentary	Timelines
	Notice (PQN) etc when requested by the Department.	<ul style="list-style-type: none"> <li>FutureNow advice for Ministerial Briefings and Parliamentary Questions on Notice is accurate and timely.</li> </ul>	
	<p>Be involved in the WA Training Awards as required.</p> <p>FutureNow will (if approached),</p> <ul style="list-style-type: none"> <li>mentor Western Australian candidates within FutureNow's industry areas in preparation for the State Awards in September and National Training Awards in November 2018.</li> <li>Participate in and promote the 2019 WA Training Awards.</li> </ul>	<p><u>Outcomes</u></p> <ul style="list-style-type: none"> <li>FutureNow staff are involved as needed and complete their judging and mentoring roles professionally.</li> </ul>	<ul style="list-style-type: none"> <li>According to Training Awards timeframes.</li> </ul>



4. Endorsement by Training Council Board of Management

BARRY FLETCHER  
Full Name of Office Bearer

CHAIRMAN  
Position of Office Bearer

[Signature]  
Signature of Office Bearer

Date 27/10/18

(Witness)

Melanie Anne McGrail  
Full Name

Executive Assistant  
Position

[Signature]  
Signature

Date 27/10/18



FutureNow Creative and Leisure Industries Training Council  
Training Council

Service Agreement 2016-2019  
Progress Report

1 Jul 2018 – 31 Dec 2018

## Deliverable 1 - WORKFORCE AND OCCUPATIONAL PRIORITIES

Provide industry intelligence and data on workforce and occupational priorities to inform the:

- State Training Board's (the Board) State Training Plan;
- Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL), Western Australian Skilled Migration Occupation List (WASMOL) and industry workforce priority profiles.

Provide written advice in accordance with Board requirements to support the development of the State Training Plan.

FutureNow submitted reports identifying industry developments, workforce challenges and workforce priorities in support of the development of the 2019-22 State Training Plan. Submissions were in the following areas:

- Accommodation
- Conference and Event Management Services
- Food and Beverage Services
- Printing and Graphic Arts
- Racing and Farriery
- Sport and Recreation
- Travel and Tourism Arrangement Services
- Creative Artists, Musicians, Writers and Performers
- Heritage Activities
- Internet Service Providers, Web Search Portals and Data Processing Services
- Library and Other Information Services
- Motion Picture Sound Recording Activities, Broadcasting and Internet Publishing
- Other Specialised Design Services
- Publishing Except Internet and Music Publishing

FutureNow continued the iterative process of data gathering during the reporting period, including through the following Industry Advisory Network (IAN) meetings and external industry forums:

- Information Communication Technology IAN
- FutureNow Mid-West Arts and Culture forum
- Galleries, Libraries, Archives, Heritage and Museums (GLAHM) IAN
- Screen and Media IAN
- Creative Technology IAN

## Deliverable 1 - WORKFORCE AND OCCUPATIONAL PRIORITIES

Provide industry intelligence and data on workforce and occupational priorities to inform the:

- State Training Board's (the Board) State Training Plan;
- Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL), Western Australian Skilled Migration Occupation List (WASMOL) and industry workforce priority profiles.

- Racing, Farriery and Equine IAN
- Print and Graphic Arts IAN
- Sport and Recreation IAN
- Hospitality IAN
- Tourism IAN
- SM TAFE Information Technology Industry Advisory Group meeting
- Skills Service Organisation project forum: Music
- Skills Service Organisation project forum: Screen, Broadcasting and Media
- Skills Service Organisation project forum: Library and Information Services
- Chamber of Arts and Culture Chief Executives Group meeting
- Dept of Jobs, Tourism, Science and Innovation: International Access Pass industry session: Games Development
- Cross sector project forum: Social Media skills
- Remix Academy forum
- Perth Festival: Shared Services forum
- WA Tourism Conference
- Trails Forum
- Event Risk Management workshop

Provide written occupational advice in accordance with Departmental requirements (as detailed in the State Priority Occupation List - Guidelines and Methodology paper);

Provide this occupational advice in accordance with the Department's annual SPOL process timelines;

FutureNow's advice which was provided in the previous reporting period supported the inclusion of the following occupations on the 2018 SPOL, released in September 2018. This SPOL information was distributed and publicised through FutureNow's Communication channels:

Priority 1:

- 262112 - ICT Security Specialist

## Deliverable 1 - WORKFORCE AND OCCUPATIONAL PRIORITIES

Provide industry intelligence and data on workforce and occupational priorities to inform the:

- State Training Board's (the Board) State Training Plan;
- Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL), Western Australian Skilled Migration Occupation List (WASMOL) and industry workforce priority profiles.

Priority 2:

- 135112 - ICT project manager
- 263112 - Network administrator
- 263113 - Network analyst
- 263311 - Telecommunications engineer
- 263312 - Telecommunications network engineer
- 322113 - Farrier
- 361112 - Horse trainer

Priority 3:

- 141111 - Cafe or restaurant manager
- 141311 - Hotel or motel manager
- 261312 - Developer programmer
- 261313 - Software engineer
- 263111 - Computer network and systems engineer
- 351112 - Pastrycook
- 351311 - Chef

Provide other occupational and market intelligence around Skilled Migration (for the WASMOL) and other occupational specific issues when requested by the Department;

No additional occupational or market intelligence around Skilled Migration was requested by the Department during this period.

FutureNow provided the DTWD with detailed written industry advice and industry contact information around labour market and training issues for it's sectors in the following regions during the reporting period:

- Gascoyne and Mid-West
- Pilbara
- South West

## Deliverable 1 - WORKFORCE AND OCCUPATIONAL PRIORITIES

Provide industry intelligence and data on workforce and occupational priorities to inform the:

- State Training Board's (the Board) State Training Plan;
- Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL), Western Australian Skilled Migration Occupation List (WASMOL) and industry workforce priority profiles.

- Peel
- Kimberley
- Wheatbelt

Provide advice to the Department on the mapping of qualifications to occupations (ANZSCO);

FutureNow provided advice on the ANZSCO/ANZSIC mapping of the following qualifications:

- Certificate I in Racing (Stablehand)
- Certificate II in Racing Industry
- Certificate III in Racing (Stablehand)
- Certificate III in Racing (Driving Stablehand)
- Certificate III in Racing Services
- Certificate III in Racing (Trackwork Rider)
- Certificate IV in Racing (Jockey)
- Certificate IV in Racing (Harness Race Driver)
- Certificate IV in Racing (Greyhound Trainer)
- Certificate IV in Racing Integrity
- Certificate IV in Racing (Racehorse Trainer)
- Diploma of Racing (Racehorse Trainer)
- Diploma of Racing Integrity Management
- Certificate III in Equine Hoof Care
- Certificate IV in Farriery
- Advanced Diploma in Performing Arts (Musical Theatre) (Commercial Dance)
- Advanced Diploma in Cyber Security

Ensure all advice on occupations provided to the Department is of a publishable standard – that is, well researched, supported by verifiable evidence, and validated (i.e.

## Deliverable 1 - WORKFORCE AND OCCUPATIONAL PRIORITIES

Provide industry intelligence and data on workforce and occupational priorities to inform the:

- State Training Board's (the Board) State Training Plan;
- Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL), Western Australian Skilled Migration Occupation List (WASMOL) and industry workforce priority profiles.

properly sourced);

Advice provided to DTWD by FutureNow was of a publishable standard and was supported by verifiable evidence (either through direct feedback from industry stakeholders and Industry Advisory Networks or validated in industry reports).

Provide six monthly updates to the Department on workforce priorities identified by the Training Council in accordance with agreed template (which will be used for capturing highlights for Skilling WA report); and

NA – not requested by the Department. Unclear whether *SkillingWA* report is currently being published.

Provide advice on workforce priorities through mutually agreed research projects with the Board or Department where appropriate

### **State Training Board's Technology and Innovation project**

In early August FutureNow provided updated submissions on the impact of key innovation and technology trends, and implications for Vocational Education and Training in the following industries:

- Creative industries
- Racing and breeding
- Sport, Fitness and Recreation

### **State Training Board's Strategy Session**

FutureNow developed sector-specific information to support the State Training Board's strategy meeting held in October 2018, attended by FutureNow's CEO.

### **Hotel Workforce Project**

FutureNow produced a scoping document and survey instruments for a project about workforce development and skills gap mapping in Perth hotels. Consultation with Hotel Managers or Hotel HR Managers will take place in January and February 2019.

## Deliverable 1 - WORKFORCE AND OCCUPATIONAL PRIORITIES

Provide industry intelligence and data on workforce and occupational priorities to inform the:

- State Training Board's (the Board) State Training Plan;
- Department of Training and Workforce Development's (the Department) State Priority Occupation List (SPOL), Western Australian Skilled Migration Occupation List (WASMOL) and industry workforce priority profiles.

### **Cross-sector Events Workforce Project**

FutureNow is preparing a position paper on the complex and wide-ranging workforce attached to the broader Events sector. In September, FutureNow met with the Financial and Professional Services Training Council in order to capture the issues relating to the security workforce that is involved in large scale events. The project will continue to be a collaborative cross sector activity.

## Deliverable 2 - APPRENTICESHIPS AND TRAINEESHIPS

Provide industry advice to the Board and the Department to inform the establishment and variation of apprenticeships and traineeships.

Deliver advice within agreed timeframes to the Board on the establishment / variation of apprenticeships and traineeships, based on consultation with industries relating to Training Council scope. This is to be done in accordance with the Vocational Education & Training Act (VET 1996) and the Guidelines for the Establishment and Variation of Apprenticeships

FutureNow provided advice to the State Training Board on the following expedited EVACs:

- Certificate III in Racing (Trackwork Rider)
- Certificate IV in Racing (Harness Race Driver)
- Certificate III in Farriery
- 

Provide advice on apprenticeships and traineeships and related policies and programs when requested by the Department;

### **Draft Apprenticeship Policy**

In September FutureNow circulated the Draft Apprenticeship Policy to industry stakeholders for comment. The feedback received was forwarded to the Department.

### **Certificates II and III in Hospitality Traineeships – employed in juice kiosks**

FutureNow provided advice on the appropriateness of Traineeships using Certificate II or Certificate III in Hospitality within Boost Juice stores. The information related to the hospitality units of competency relevance to the business and position descriptions; the appropriateness of the workplace in meeting assessment requirements; and the suitability of Certificate III in Hospitality for a team leader position.

### **Certificate III in Hospitality School-based Traineeship – employed by school**

In August FutureNow provided advice to the Regulation and Compliance team of the Apprenticeship Office about what constitutes a 'shift' / service period in hospitality, and the industry definition for the term 'within commercial time constraints and deadlines'. The information was used in the analysis of School-based Trainees doing Certificate II in Hospitality or Certificate III in Hospitality that are employed by their school.

In October FutureNow consulted with Industry and provided advice on the appropriateness and likelihood that industry conditions are replicated when the school is the employer of School-based trainees undertaking the Certificate III in Hospitality.

## Deliverable 2 - APPRENTICESHIPS AND TRAINEESHIPS

Provide industry advice to the Board and the Department to inform the establishment and variation of apprenticeships and traineeships.

### **Certificate III in Print Communications**

The Department sought advice on the suitability of the training plan proposed for an apprentice in Bunbury enrolled in the ICP31415 Certificate III in Print Communications. WA TAFE Colleges have withdrawn from providing this training, and the replacement provider (TAFE SA) is no longer enrolling WA apprentices in this qualification. A private Eastern States provider with a trainer based in Perth has offered to deliver the training, mainly online but with a low number of contact hours. FutureNow recommended conditional support for the arrangements with some stringent provisos. FutureNow developed a position paper around this particular thin market situation which was distributed to industry stakeholders and to the Department. .

Through normal operations, promote apprenticeships and traineeships to industry, including work based training and where higher level VET qualifications may apply;

FutureNow continues to promote awareness of the apprenticeship model to industry including through the Industry Advisory Network meetings held during this period, through the FutureNow monthly e-newsletter, and through content on our website and LinkedIn pages.

### **Hospitality Ambassador Program**

The Hospitality Ambassador Program continued delivering school presentations in the third and fourth school terms of 2018. During 2018, 4 School Based Apprenticeship applications and 6 Full-time Apprenticeship applications were made by students that had attended a presentation. The Program is facilitated by Hospitality Group Training with funding from Tourism WA and support from FutureNow.

Provide annual feedback to the board regarding factors that may have impacted on the take up of recently established apprenticeships and traineeships

Annual feedback regarding the take-up of recently established apprenticeships and traineeships was not requested in this time period.

### Deliverable 3 - VOCATIONAL EDUCATION AND TRAINING, Vet for Secondary School Students.

Provide industry leadership and support to improve school and industry engagement.

Provide advice within agreed timeframes to the Department on qualifications appropriate for delivery under the VET in Schools program

FutureNow consulted with industry networks to review the information in the VET Qualifications Register for Secondary Students. The review included some changes to existing entries as well as completion of information reflective of industry views for new entries in the register.

Changed entries included:

- The “High Risk” notation added to the Auspicing Advice column for RGR20218 Certificate II in Racing Industry. This new qualification has four specialisations, two of which are horse-related and two of which relate to track maintenance and administration. The High Risk notation relates particularly to the horse units, and makes the certificate’s entry more consistent with others on the Register. A standard paragraph about schools generally not being able to meet the requirements under an auspicing arrangement was also included, in line with other similar entries in the register. As a result of this change, the qualification has been changed from a green to an orange classification.
- Industry requested a change in the classification of the Certificate III in Fitness, from a red to an orange flag. This change was underpinned by information added to the Industry Advice columns in the register, including a High Risk notation and information around the importance of work placements, structured learning plans for those placements, supervision arrangements, and a suggested amount of hours for work placements.
- The two new Sport Diplomas were both red flagged, and this was consistent with the existing entries which the industry did not suggest needed changing.
- Consolidated Industry advice was provided for Certificate III in Hospitality to emphasise that School-based Traineeships attached this qualification are only supported when the trainees are working in a commercial hospitality business and are gaining exposure to industry.

Through normal operations, including Industry Advisory Network meetings, the FutureNow monthly e-newsletter, and through stories on it’s website and LinkedIn, FutureNow continued to promote awareness of the register with stakeholders.

In response to RTO queries to the department, at the department’s request FutureNow canvassed industry views on the delivery to secondary students of the Certificates III and IV in Fitness. This advice was provided outside of the annual review of the VET Qualifications Register for Secondary Students, and the issue was revisited during the review.

## Deliverable 4 - TRAINING PACKAGES

Provide industry advice to the Department regarding the development, review and endorsement and implementation of Training Packages.

Provide advice and recommendations to the Department on:

- the development, review, endorsement and implementation of Training Packages; and
- nominal hours for the newly endorsed qualifications/courses

In the provision of advice on the endorsement of training packages, evidence of the consultation with industry and RTOs, and the identification of any contentious issues, are to be included in the agreed template.

### **SIT Tourism, Travel and Hospitality Training Package**

FutureNow distributed an EOI invitation on behalf of SkillsIQ for the Events Technical Advisory Committee (TAC). Liz Bindon-Bonney of North Metropolitan TAFE and Le Cordon Bleu Institute was elected to the Events TAC in October.

FutureNow distributed information regarding the addition of three new units of competency related to Travel qualifications.

FutureNow distributed information on the Case for Change for Responsible Service of Alcohol units of competency and skills set for comment.

### **BSB Business Services Training Package**

On Department request, FutureNow distributed an EOI invitation to sit on the Project Working Group (PWG) for a review of the *BSB Business Services* Training Package which includes Library and Information Services qualifications that sit under FutureNow's coverage. A FutureNow stakeholder representing the WA Museum, and FutureNow's Industry Manager, have been appointed to the PWG.

### **ICT Information Communications Technology Training Package**

On Department request, FutureNow distributed a call out for stakeholder feedback on a series of projects to review the *ICT Information Communications Technology* Training Package.

FutureNow worked with SSO *PwC Skills for Australia* to support WA industry engagement with a series of consultation workshops for projects related to the BSB, ICT, ICP and CUA training packages. This SSO was also supported by requests to industry from FutureNow for comment on the Cross Sector Supply Chain Skills project.

### **Racing and Breeding Training Package**

FutureNow worked with SSO Skills Impact to request industry feedback for three Racing and Breeding Training Package upgrade projects, which included consultation

## Deliverable 4 - TRAINING PACKAGES

Provide industry advice to the Department regarding the development, review and endorsement and implementation of Training Packages.

workshops.

FutureNow arranged for departmental staff to meet with a representative of Racing and Wagering WA to discuss an issue about the nominal hours allocated to the amended Racing and Breeding (RGR) Training Package. The department also requested input from FutureNow regarding confirmation/correction of information in the Companion Volume Implementation Guide Release 2.0 and Case for Endorsement for the RGR Training Package.

### **Sport, Fitness and Recreation Training Package**

FutureNow worked with Outdoors WA and the Department of Local Government, Sport and Cultural Industries to arrange a consultation forum for SkillsIQ, the Skills Service Organisation for the Sport and Recreation sectors, to hear WA stakeholder views on the Draft 1 materials developed as part of the Outdoor Recreation Project. The project is a review of the following qualifications and their units of competency:

- SIS20518 Certificate II in Outdoor Recreation
- SIS30818 Certificate III in Outdoor Leadership
- SIS40518 Certificate IV in Outdoor Leadership
- SIS50518 Diploma of Outdoor Leadership.

FutureNow also assisted SkillsIQ with requests for industry feedback for Draft 2 training products from the Sport Training Package Development project, focusing on qualifications for coaches, trainers and officials.

### **Cross Sector Training Products**

On Department Request, FutureNow distributed for comment on the following cross sector projects:

- Draft Case for Endorsement relating to Teamwork and Communication
- Draft Case for Endorsement relating to Inclusion of People with a Disability
- Draft 1 of Training Product for Online and Social Media Training Package
- Draft units for the Cross Sector Supply Chain Skills project.

Two units relating to people with a disability were subsequently included in the TAE Training Package, and FutureNow distributed this TAE Cross Sector Case for Change to networks for feedback.

## Deliverable 5 - OTHER

Provide other advice to the Board and Department as specified.

Engage with the Board:

- in strategic and project meetings; and
- on Board projects and research

- FutureNow's CEO contributed to the State Training Board strategy session in October 2018.
- FutureNow's CEO provided detailed feedback and advice on the Draft Service Delivery Agreement for the contract due to commence in July 2019.
- FutureNow's CEO briefed the Director of the Office of the State Training Board on workforce development issues in the Tourism, Hospitality and Events Sector prior to a meeting between the State Training Board, Department of Training and Workforce Development and TourismWA.
- 

Provide advice required for the purposes of addressing Ministerial briefings, Parliamentary Questions on Notice (PQN) etc when requested by the Department; and be involved in the WA Training Awards as required.

FutureNow provided an Industry Manager to the judging panel for the Large Training Provider of the Year Award as part of the WA Training Awards. FutureNow's Industry Manager joined the panel Chair in attending site visits at Geraldton, Murdoch and East Perth TAFE campuses.

As mentioned in Deliverable 1, FutureNow collected written and verbal industry intelligence to assist the Department in updating its regional labour market reviews of the Gascoyne and Mid-West, Pilbara, South West, Peel, Wheatbelt and Kimberley regions. This information was presented to the Department team undertaking the work.

# Realising Potential

---

*Solving Australia's tertiary  
education challenge*

**FEBRUARY 2019**

The Australian Industry Group



# CONTENTS

---

## 1. INTRODUCTION

## 2. PARTICIPATION

## 3. RECENT DEVELOPMENTS IN TERTIARY EDUCATION

## 4. THE WAY FORWARD

- 4.1 Establish a long term view
- 4.2 Create a more coherent and connected system
- 4.3 Adjust the shape of tertiary education
- 4.4 Facilitate movement between institutions
- 4.5 Establish governance arrangements
- 4.6 Establish equitable funding arrangements
- 4.7 Improve demand driven funding mechanisms
- 4.8 Create equitable student contributions
- 4.9 Improve nationally consistent quality
- 4.10 Resolve tensions at the borders of the sectors and training for para-professional occupations
- 4.11 Promote workplace learning as a key delivery component in all post-secondary education
- 4.12 Reconsider qualifications

## 5. CONCLUSIONS

## REFERENCES

### *Acknowledgement*

*This document was researched, developed and written by Michael Taylor, National Policy and Projects Manager, Education and Training, The Australian Industry Group.*

# EXECUTIVE SUMMARY



This latest Ai Group report closely examines our tertiary education system which includes all post-secondary education arrangements. It sets the challenge to create an effective education and training system that is both more coherent and more connected. Importantly, it makes a number of recommendations for policy makers including a call for the development of a longer-term vision and policy framework for tertiary education rather than a reliance on short-term reviews of elements of the system.

Tertiary education is vitally important to Australian society and the economy. From an industry perspective the sectors within tertiary education provide both the skilled and qualified entrants to the workforce as well as the re-skilling or up-skilling of the existing workforce. If the Australian economy is to continue to prosper and remain internationally competitive, it is vital to have access to a highly skilled and qualified workforce. Indeed, with the rapid advance of technology and digitalisation, a higher level of skills for the workforce is more important than ever.

This statement highlights that we have now entered an era of mass tertiary education and the achievement of higher level qualifications. Today, 85 per cent of young people complete secondary education and most proceed to some form of tertiary education. In the decade to 2015 the proportion of the workforce without post-school qualifications fell from 42 to 32 per cent. There has been significant expansion of participation in the higher education sector and Australia is very close to achieving the Bradley Review target of 40 per cent of 25 to 34 year-olds having a degree by 2020. The VET sector is the largest education sector with over 4.2 million students.

Despite this impressive growth in recent decades, the sectors are beset with a range of challenges. Chief among these is the development of a binary system characterised by seriously unbalanced participation between the sectors. The recent dramatic falls in VET participation have also been accompanied by declining funding levels which seriously jeopardise the sector.

The education and training landscape needs to be broadened to include institutional differentiation that takes account of diverse student needs. And given the reality of rapidly changing workplaces and the need for agile skill development, there needs to be a much more effective system of learner mobility and recognition between institutions and sectors.

There is a lack of overall policy direction and governance of the system. Consideration needs to be given to the formation of a central and independent coordinating agency to provide common approaches across the sectors and levels of government. While more effective methods of governance require more than addressing funding levels, a more equitable funding strategy needs to be developed. The VET sector is in need of immediate attention in this area. In this context, demand-driven funding models need to be retained but improved to be more equitable than current practice.

The current situation concerning student loans is discriminatory and unacceptable. A way needs to be found to introduce a loans scheme with common characteristics across the sectors, initially for diploma level courses and above.

In the area of regulation, a more effective approach is required to strengthen the quality of education and training provision. Tertiary Education Quality and Standards Agency (TEQSA) and Australian Skills Quality Authority (ASQA) should be maintained while developing common or joint functionality in particular areas to strengthen national consistency. Work based learning is becoming increasingly important and more innovative ways need to be found in both sectors to expand the participation of industry in the delivery of tertiary qualifications.

The review of the Australian Qualifications Framework is timely as this provides a key opportunity to reconsider whether our current qualifications structure is adequately meeting our needs into the future.

These are formidable challenges, but we can find solutions. We need to rise to the occasion for a comprehensive reconsideration of the state of tertiary education in Australia. This report identifies those challenges and will hopefully contribute to making our tertiary education system deliver better outcomes for the benefit of the community and the economy.

*Innes Willox*

A handwritten signature in black ink that reads "Innes Willox". The signature is written in a cursive style and is positioned above a thin horizontal line.

*Chief Executive, Australian Industry Group*

# KEY FINDINGS

---

- > Tertiary education in Australia is a mass education and training system reflecting the reality that most young people now participate in this level of education before entering the workforce.
- > Tertiary education is characterised by a highly unbalanced binary model with no coherent policy and funding framework.
- > There is a need to establish a long-term policy view for tertiary education rather than short-term attempts to address components of the overall system.
- > While recognising the distinctive features of higher education and VET, there is a need for a more coherent and connected tertiary education system to be established.
- > Given the increasing diversity of learner needs it is desirable to have a greater variety of provider types within the tertiary education system.
- > Given the low volume of student transfer between higher education and VET there is a need for a model that includes more systematic methods to facilitate movement between the sectors.
- > Establish an independent coordinating body charged with the responsibility of delivering government policy in a more coherent manner.
- > A key function of an independent coordinating body would be to establish equitable funding arrangements across the sectors and between levels of government.
- > Given the more effective responsiveness to the labour market, demand-driven funding mechanisms need to be retained and improved in tertiary education.
- > Establish a universal tertiary education student loan scheme, initially for diploma and above courses, to create a more equitable and cost-effective system.
- > Maintain both TEQSA and ASQA as respective regulators for their systems while establishing joint functionality in appropriate and agreed areas.
- > There is a need for greater and more equitable policy and funding coherence for mid-professional learning where the higher education and VET sectors overlap.
- > Promote workplace learning as a recognised key delivery component in all tertiary education.
- > The qualifications structure in Australia needs to be reviewed to consider the emergence of micro-credentials and any other developments impacting on the key outcomes of tertiary education.

# 1. INTRODUCTION

---

For the purposes of this statement tertiary education refers to all post-secondary education and includes education and training currently provided by both the higher education and the vocational education and training (VET) sectors. The statement is particularly focused on the education and training requirements for entry to the workforce and subsequent upskilling provided by these sectors.

The economy is irresistibly moving towards a knowledge society and increasingly requiring higher levels of knowledge and skills for the workforce. Is tertiary education in Australia able to provide the necessary knowledge and skills for the emerging workforce? What are the challenges faced by the sector in the achievement of this?

What does a set of key characteristics for an effective tertiary education and training system look like? One of the most significant reviews of higher education, the 2008 Bradley Review, identified the following:

- > Equal value is given to both VET and higher education, reflecting the importance of their different roles in the development of skills and knowledge and their contributions to the economy and society
- > Recognition that institutions may have a primary mission in one sector, but should still be able to offer qualifications in the other sector
- > A shared and coordinated information base and approach to anticipating future labour market needs, industry needs and demographic trends
- > A capacity for the whole system to provide integrated responses to workforce needs for industries and enterprises, including those in specific localities and communities like outer metropolitan and regional areas where there is significant population growth, low levels of educational attainment and participation and uneven provision
- > An efficient regulatory and accountability framework
- > Clearer and stronger pathways between the sectors in both directions.<sup>1</sup>

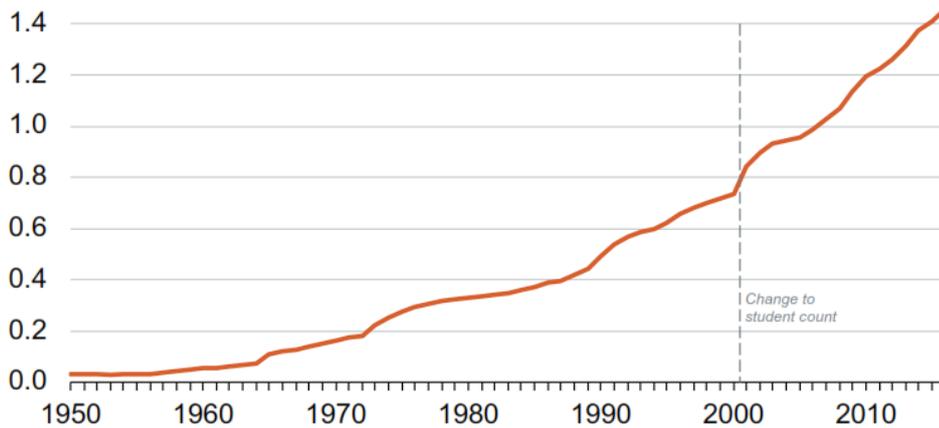
---

<sup>1</sup> Review of Australian Higher Education, Final Report, December 2008, page 179.

# 2. PARTICIPATION

In consideration of the level of participation in tertiary education it is clear that the growth in both sectors has been significant in recent decades.<sup>2</sup>

**Chart 1: Higher education enrolments, 1950 - 2016 (millions of students)**

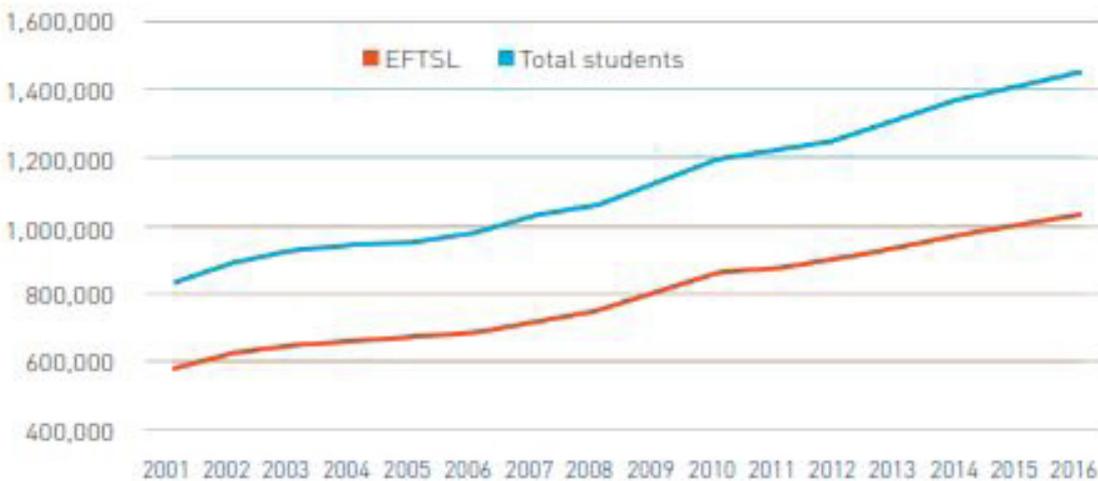


*Note: Figures from 2001 onwards are based on enrolments at any time throughout the year; prior years are based on enrolments as at 31 March.*

*Sources: Department of Education and Training (various years[a]), Department of Education and Training (2014) and Department of Education and Training (2018a).*

The most recent data snapshot provided by Universities Australia provides enrolment data from 2001 to the later year of 2016 which indicates the total enrolment now exceeds 1.48 million domestic and international students.<sup>3</sup>

**Chart 2: Student Enrolments and Equivalent Full-Time Student Loads, 2001 - 2016**



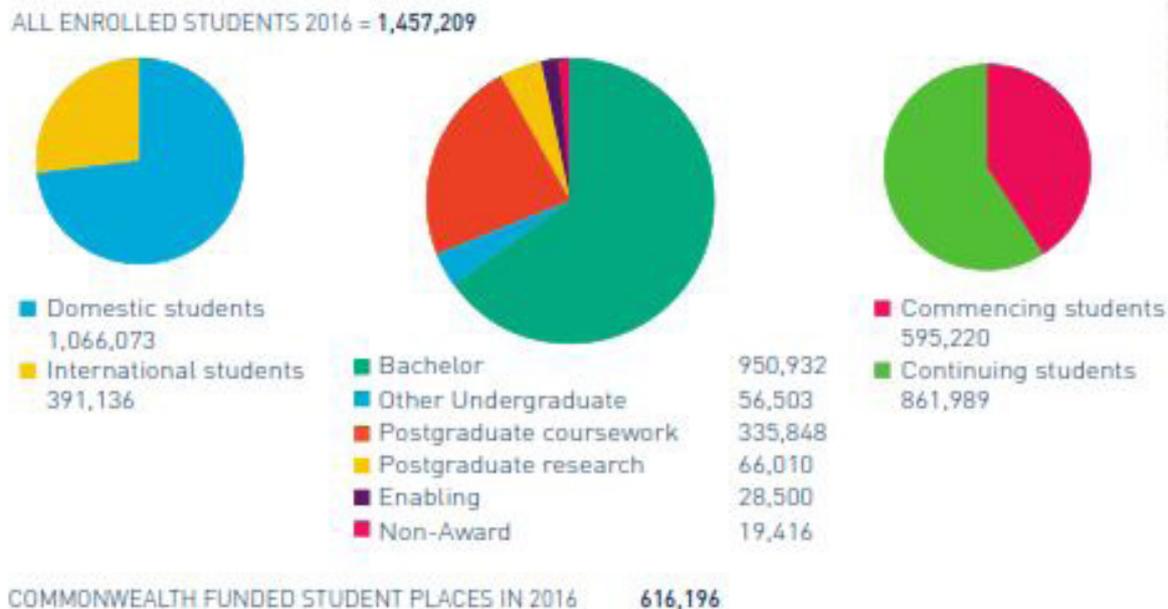
<sup>2</sup> Norton A., *Mapping Australian higher education 2016*, Grattan Institute.

<sup>3</sup> Universities Australia, *Data Snapshot*, 2018.

2. PARTICIPATION

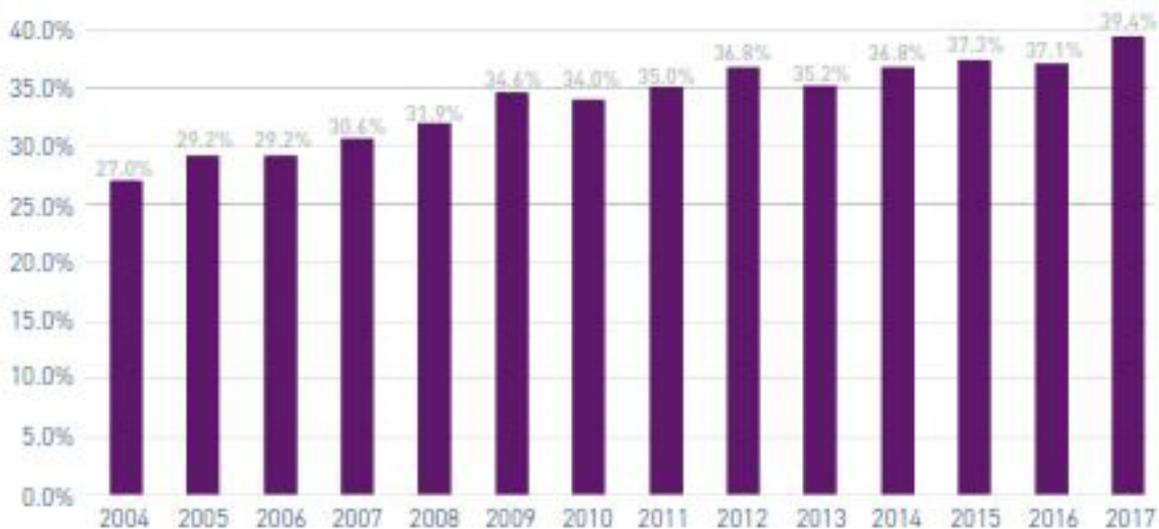
A breakdown of this data indicates that there are now over a million domestic students while international students are approaching 400,000.<sup>4</sup>

**Chart 3: Student enrolments by category, 2016**



This significant expansion of participation in higher education now means that Australia is very close to achieving the Bradley Review target of 40 per cent of 25 to 34 year-olds to have a degree by 2020.<sup>5</sup> According to the ABS, 39.4 per cent of this age category have achieved this outcome.<sup>6</sup> The Grattan Institute’s latest data indicates that in 2016 41 per cent of Australian 19-year-olds were enrolled in higher education institutions.<sup>7</sup>

**Chart 4: Proportion of Australians aged 25 to 34 with a bachelor degree of higher**



Source: ABS 6227.0, Education and Work, May 2017

<sup>4</sup> Universities Australia, Data Snapshot, 2018.

<sup>5</sup> Review of Australian Higher Education, Final Report, Commonwealth of Australia, December 2008.

<sup>6</sup> Australian Bureau of Statistics 6227.0, Education and Work, May 2017 cited in Universities Australia, Data Snapshot, 2018.

<sup>7</sup> Norton A. and Cherastidtham I., Mapping Australian higher education 2018, Grattan Institute, 2018.

## 2. PARTICIPATION

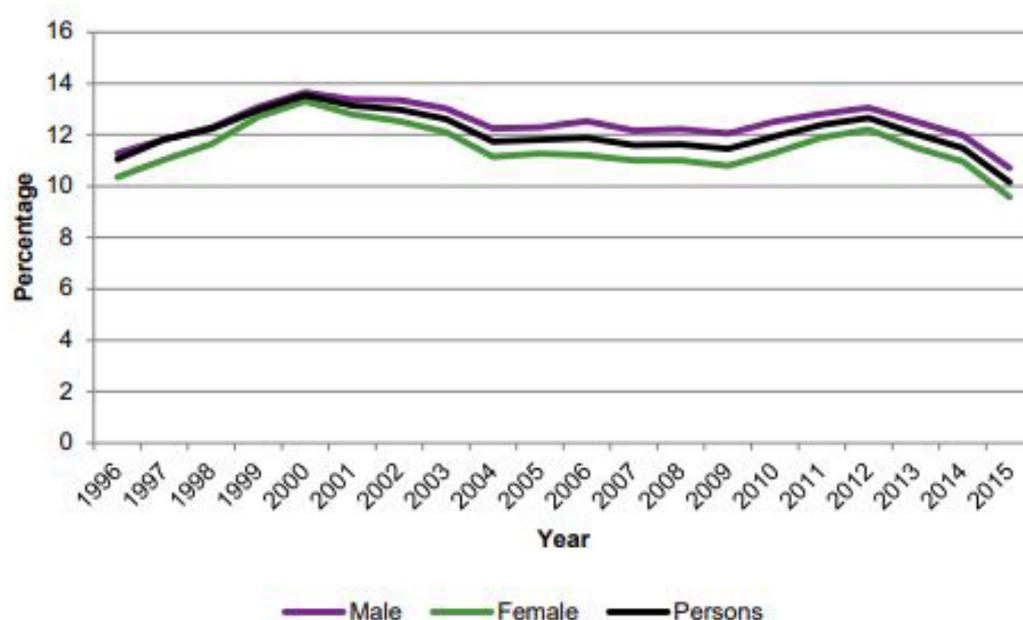
In the VET sector the level of participation is very high. The most recent indication of total VET activity by the NCVER indicates that over 4.2 million students were enrolled in VET with an Australian training provider in 2017. This amounts to 3.4 million program enrolments.<sup>8</sup>

**Table 1: Training providers by type and state or territory, 2017 ('000)**

Provider type	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Overseas	Other	Total
TAFE	281.5	149.3	84.1	49.9	56.1	18.3	2.1	12.9	23.4	2.6	680.2
University	0.1	37.2	5.5	0.0	0.4	0.6	8.7	0.0	3.6	0.0	56.2
School	33.8	14.9	26.6	0.6	1.7	2.0	0.5	2.3	-	0.1	82.6
Community education provider	146.1	102.9	38.2	36.1	47.8	0.8	6.2	6.0	0.0	0.2	384.3
Enterprise provider	20.9	7.4	21.9	7.2	14.8	0.4	2.0	0.2	0.3	0.3	75.5
Private training providers	741.5	644.2	651.0	112.8	207.6	27.0	21.3	50.1	6.9	87.1	2 549.4
Attending more than one provider type	106.2	66.8	77.3	24.3	45.0	5.1	4.7	4.9	0.0	73.3	407.5
<b>Total estimated students</b>	<b>1 330.2</b>	<b>1 022.8</b>	<b>904.6</b>	<b>230.8</b>	<b>373.4</b>	<b>54.1</b>	<b>45.5</b>	<b>76.4</b>	<b>34.3</b>	<b>163.6</b>	<b>4 235.6</b>

The VET sector is the largest education sector in Australia. There were about 1.6 million students in the publicly funded system in 2015 and training is undertaken by people of all ages, with the largest proportion aged 24 years and under. Over the last 20 years the number of students initially participating increased, but in recent years has started to fall.<sup>9</sup>

**Chart 5: Rates of participation in VET, 1996 - 2015 (%)**



Note: The rate is expressed as students as a proportion of the 15 to 64-year-old population.

Source: NCVER Historical time series of government-funded VET 1996–2015; ABS demographic statistics, cat.no.3101.0, September 2015.

This data from both sectors indicates that Australia has entered an era of mass tertiary education. Eighty-five per cent of young people now complete a full secondary education and most proceed to gain tertiary qualifications.<sup>10</sup>

<sup>8</sup> Total VET students and courses 2017, NCVER, Commonwealth of Australia, 2018.

<sup>9</sup> Atkinson G and Stanwick J., Trends in VET: policy and participation, NCVER, 2016.

*“There is an expectation from young people, parents, government and employers that most young people will go into tertiary education before entering the workforce.”  
(Business Council of Australia)<sup>11</sup>*

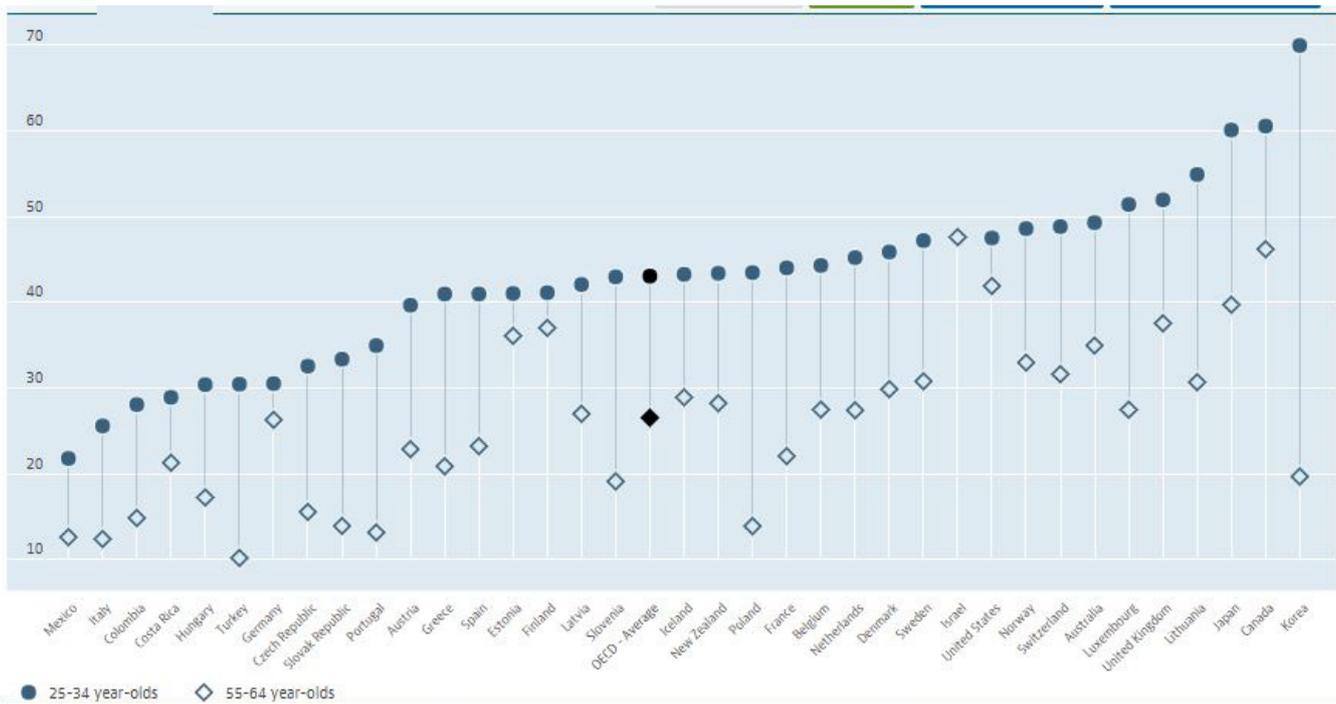
Another way of expressing this is that there is a movement towards universal participation in tertiary education. School completion, while necessary, is no longer considered sufficient for effective participation in the economy and society. Between 2005 and 2015 the proportion of the workforce holding a bachelor degree or higher qualification increased from 23 to 31 per cent while the holding of VET qualifications increased from 26 to 32 per cent. In the same decade to 2015 the proportion of the workforce without post-school qualifications fell from 42 to 32 per cent.<sup>12</sup>

**KEY FINDING**

*Tertiary education in Australia is a mass education and training system reflecting the reality that most young people now participate in this level of education before entering the workforce.*

Australia compares well with other OECD countries in this respect. On average across OECD countries, the share of 25-64 year-olds with a tertiary degree has increased by 14 percentage points since 2000 to 36 per cent in 2016. The increase is even higher among younger adults (25-34 year-olds) as the share increased by 17 percentage points to 43 per cent in 2016. Australia has achieved better than the OECD average and is only behind six other countries: Korea, Canada, Japan, Lithuania, the United Kingdom and Luxembourg.<sup>13</sup>

**Chart 6: OECD population with tertiary education 25 - 34 years/55 - 64 years, % in same age group, 2016**



<sup>10</sup> Noonan P and Pilcher S., Participation in tertiary education in Australia, Mitchell Institute, April 2018.  
<sup>11</sup> Future-Proof: Protecting Australians through education and skills, Business Council of Australia, October 2017.  
<sup>12</sup> Noonan P., A new system for financing Australian tertiary education, Mitchell Institute, September 2016.  
<sup>13</sup> OECD, At a glance, 2017.

# 3. RECENT DEVELOPMENTS IN TERTIARY EDUCATION

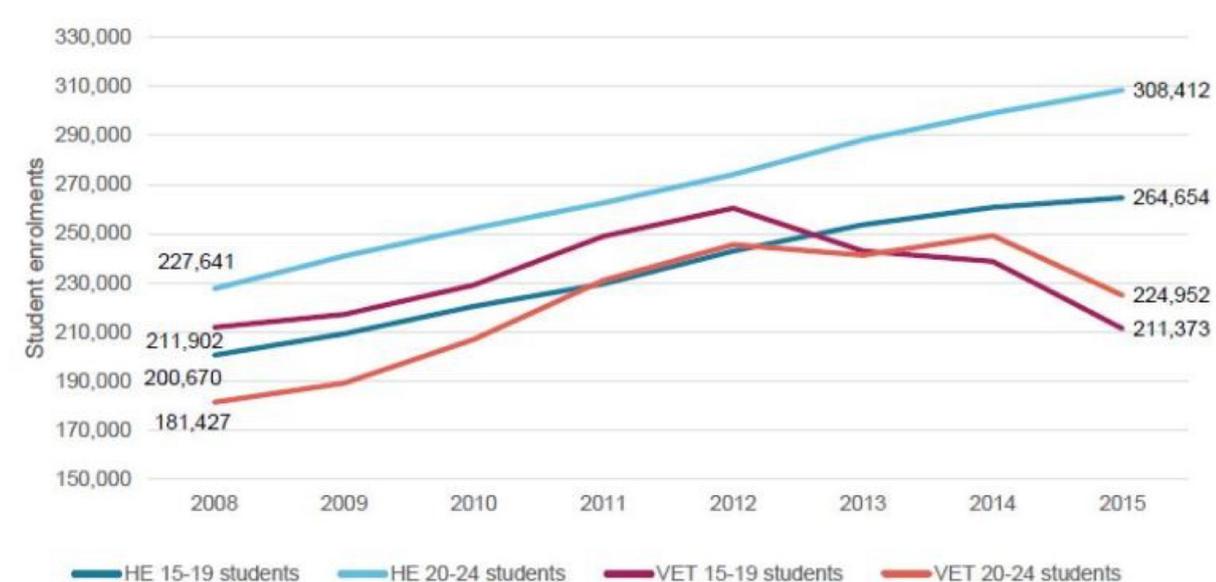
While the increases in the level of participation in recent decades represent a significant achievement, there are several challenges confronting the sectors.

In recent years there has been a significant shift by young people into higher education rather than VET. Participation has been growing significantly in higher education for both the 15 - 19 year-old students and the 20 - 24 years of age students, especially since 2008. In the VET sector both of these age cohorts grew until around 2012, but they have been in decline since thus creating a significant imbalance.<sup>14</sup>

The Productivity Commission has raised concerns about this enrolment pattern and the lack of confidence and stability in the VET sector.

*“Given the current enrolment growth rates following the move to a demand-driven university model, it will not be too long before the university sector is the key vehicle for skills formation in the economy.”* (Productivity Commission)<sup>15</sup>

**Chart 7: HE and VET student enrolments 2008 - 2015**



Analysis of the trends in real expenditure across the various sectors reveals a highly imbalanced situation. Higher education expenditure has grown very rapidly with a 52.6 per cent increase over the ten-year period from 2005-6 to 2015-16, despite some levelling off in the final year. Similarly, school sector expenditure has increased by 30 per cent over the same period with some slowing in the final year. In the VET sector, the situation is the reverse. Expenditure has fallen by 4.7 per cent over this period. The level is now lower than at the beginning of the period. Not only is overall VET expenditure in decline but the gap with higher education expenditure is increasing.<sup>16</sup>

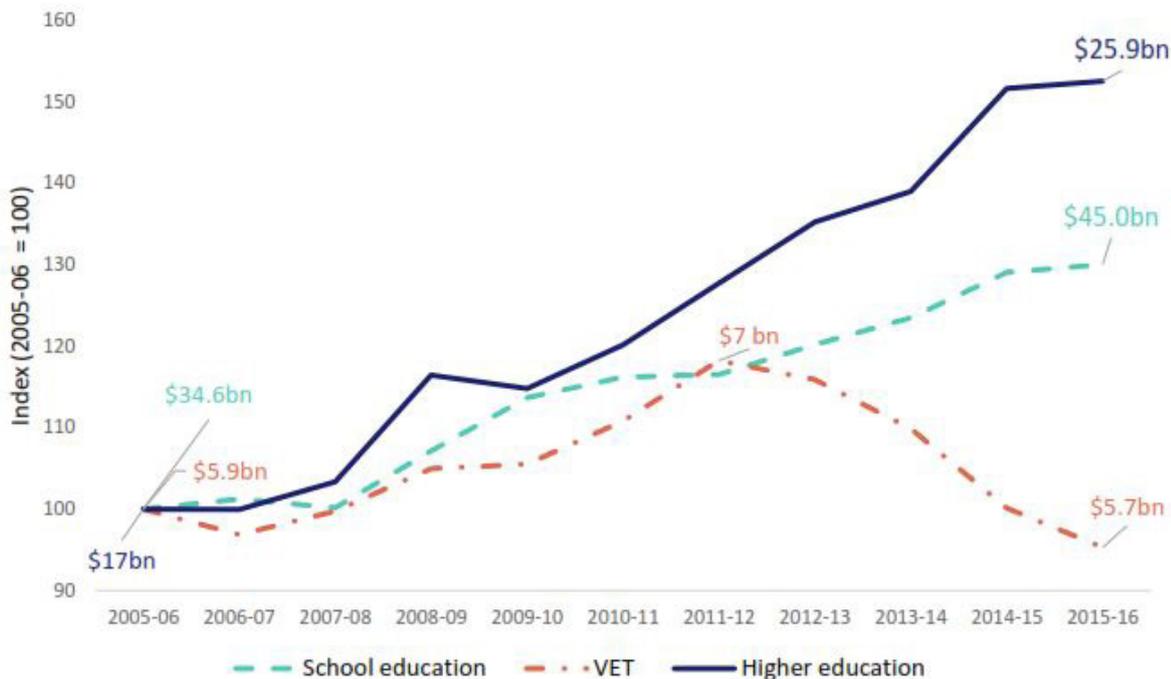
<sup>14</sup> Noonan P, *A new system for financing Australian tertiary education*, Mitchell Institute, September 2016.

<sup>15</sup> *Shifting the Dial: 5 year productivity review*, The Productivity Commission, 2017.

<sup>16</sup> Pilcher S and Torii K, *Expenditure on education and training in Australia 2017*, Mitchell Institute, December 2017.

*“The obvious disjuncture between VET and higher education in particular, reflects an ongoing failure to conceptualise the two as part of a more coherent tertiary education system. This lack of policy coherence continues to act as a barrier to the creation of the responsive, integrated education and training system many have argued Australia needs.” (The Mitchell Institute)<sup>17</sup>*

**Chart 8: Expenditure on education by sector 2005-06 to 2015-16 (base year 2005-06 = 100)**



Source: Mitchell Institute analysis of Australian Bureau of Statistics data (custom request)

This lack of funding coherence has not been addressed in any of the various reviews of higher education and of VET. The most recent significant review, the 2008 Bradley Review, argued for closer links between the sectors with equal value to the different roles of each. This included recommending a national tertiary funding framework and warning of the dangers of a growing funding gap between the sectors.<sup>18</sup>

A further consideration is the composition of public funding for VET, or more precisely, the shared contributions of the Commonwealth and the States/Territories. The funding by the jurisdictions is falling in absolute terms and also relative to Commonwealth expenditure. The relative funding shares between the Commonwealth and the jurisdictions vary significantly and have been aggravated by the progressive introduction of differential student training entitlement funding models by all states and territories. The jurisdictions have used in-built flexibility parameters resulting in differences in the eligibility requirements, the courses eligible for an entitlement, course subsidy levels, the quality requirements of providers, and the information provided to students.<sup>19</sup>

A recent finance report from the NCVET highlights a decline in government expenditure between 2013 and 2016. There has been an increase from 2016 to 2017. Revenue has experienced an 11.9 per cent decline over the period.<sup>20</sup>

<sup>17</sup> Pilcher S and Torii K., *Expenditure on education and training in Australia 2017*, Mitchell Institute, December 2017.

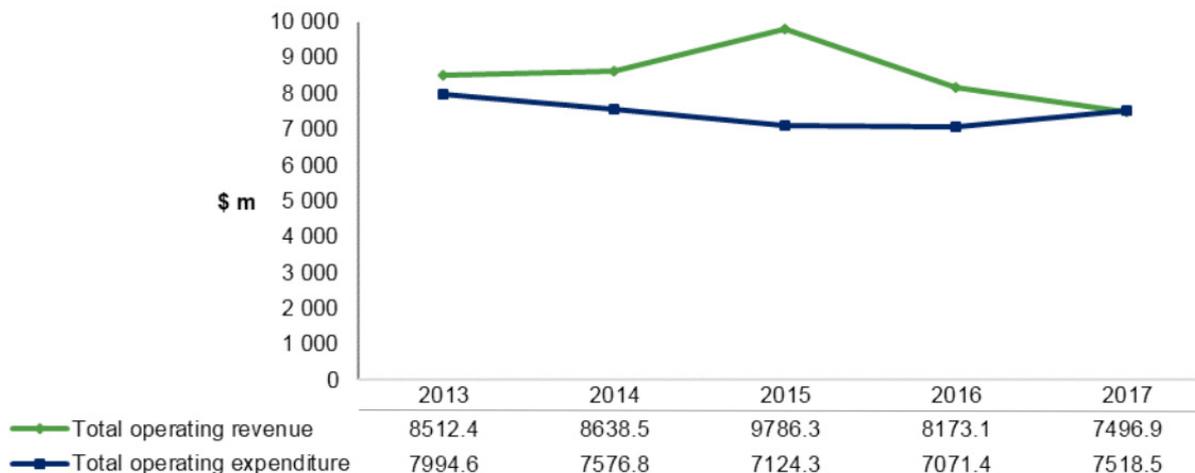
<sup>18</sup> *Review of Australian Higher Education, Final Report*, December 2008.

<sup>19</sup> Kaye Bowman and Suzy McKenna, *NCVER, Jurisdictional approaches to student entitlements: commonalities and differences*, 2016

<sup>20</sup> *Financial information 2017*, NCVET, 2018.

Chart 9: Government VET operating expenditure and revenue, 2013 - 2017

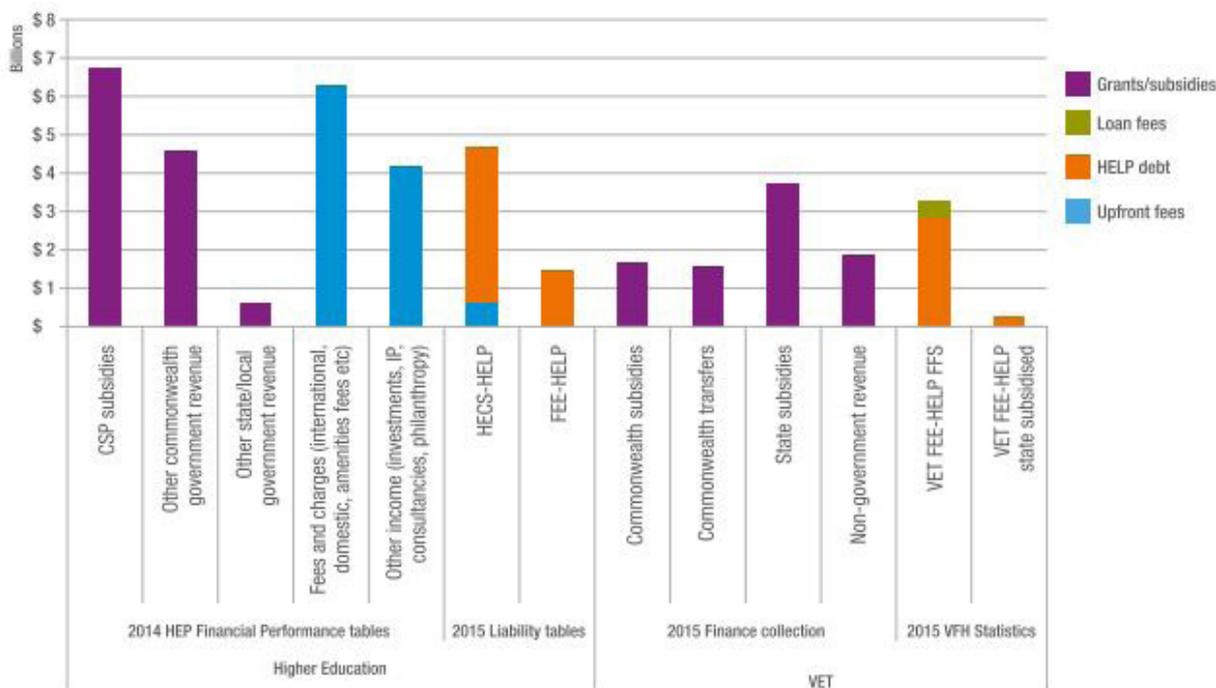
### Government VET operating revenue and expenditure, 2013–17



(Reporting in nominal terms).

The lack of funding policy coherence has led to a lack of clarity about the basis of the contributions by the Commonwealth and States and Territories. Currently the Commonwealth has a major funding role in both higher education and VET, whereas the States only have a role in the funding of VET.<sup>21</sup>

Chart 10: Funding for higher education and VET in Australia, 2014/2015



Source: Department of Education and Training, Finance Statistics, 2016

<sup>21</sup> Croucher G., Noonan P. and Chew J., *Funding an expanded tertiary system: designing a coherent financing architecture in Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

The Mitchell Institute has highlighted a number of anomalies in the financing of tertiary education including:

- > Differential treatment of students,
- > Inconsistency in the eligibility for fees and subsidies,
- > Inconsistent access to income contingent loans and student income support,
- > The widening investment gap between higher education and VET,
- > A growing gap in per student funding levels, and
- > Potential distortion of student choice.<sup>22</sup>

In addition to these significant issues facing the VET sector, the higher education sector is under increasing pressure.

*“The current model of Australian higher education - basically 39 public universities - is dissolving as it faces the unrelenting push for greater productivity, the introduction of a demand-driven funding model and the emergence of new providers, both private and TAFE institutes, as well as heightened discussion about contemporary occupational requirements and persistent concerns about the system’s quality.”* (Beddie)<sup>23</sup>

Within higher education there are further pressures on universities. Historically universities have research as a distinctive feature in addition to teaching. Indeed, to be a full Australian university a higher education provider must be active in research across at least three broad fields of study.<sup>24</sup>

This research requirement makes it difficult for new universities to commence and universities cannot be solely dedicated to teaching. Teaching and research functions compete for time, attention and resources.

In addition to this issue is the reality that higher education has become a significant export industry. The education of international students is now Australia’s third largest export. The ABS estimates that international student fee revenue earned by all Australian higher education providers totalled \$7.6 billion in 2016 and \$9.3 billion in 2017.<sup>25</sup> International student fees are the single largest source of university revenue. Once again this requires higher education providers to devote attention and resources to this key area of their operations.

## KEY FINDING

---

*Tertiary education is characterised by a highly unbalanced binary model with no coherent policy and funding framework.*

---

<sup>22</sup> Noonan P., *Building a sustainable funding model for higher education in Australia*, Mitchell Institute, January 2015.

<sup>23</sup> Beddie F., *A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities*, NCVER Research Report, Commonwealth of Australia, 2014.

<sup>24</sup> Norton A., *Mapping Australian higher education 2016*, Grattan Institute.

<sup>25</sup> Norton A. and Cherastidtham I., *Mapping Australian higher education 2018*, The Grattan Institute, 2018.

# 4. THE WAY FORWARD

---

## 4.1 Establish a long-term view

It is necessary to adopt a long-term view, say a vision to 2030+, to reset post-secondary education as a platform for knowledge-era nation-building.<sup>26</sup> There has been a series of reviews into policy and funding issues pertaining to higher education in the last two decades. These include:

- > 1988 Higher Education: a Policy Statement (Dawkins)
- > 1998: Learning for Life: review of higher education financing and policy (West Review)
- > 2002: Review of Higher Education in Australia (Nelson Review)
- > 2008: Review of Australian Higher Education (Bradley Review)
- > 2011: Higher Education Base Funding Review (Lomax-Smith Review)
- > 2015: Report of the National Commission of Audit
- > 2014: Review of the Demand Driven Funding System (Kemp-Norton Review).<sup>27</sup>

These reviews provide background to the current Government's discussion paper, Driving Innovation, Fairness and Excellence in Australian Higher Education. This is not a review as such, but rather a consideration of the 2014 - 15 budget proposals and some other reform options. It attempts to address higher education funding rather than the overall system and its place in the broader policy landscape.<sup>28</sup>

While all of these reviews achieved reforms, it is clear that none of them developed a long-term strategic view of the system of tertiary education.

In the VET sector reviews have been less frequent. Apart from the occasional VET reform in the State jurisdictions, the last full review of the national VET system was the Kangan Report of 1974.

What is required is a comprehensive vision for both sectors that stretches well into the future to provide long-term direction and stability to tertiary education.

### KEY FINDING

---

*There is a need to establish a long-term policy view for tertiary education rather than short term attempts to address components of the overall system.*

<sup>26</sup> Sharrock G., Six things Labor's review of tertiary education should consider, *The Conversation*, May 25, 2018.

<sup>27</sup> Higher Education in Australia: A review of reviews from Dawkins to today, Commonwealth of Australia, 2015.

<sup>28</sup> Driving Innovation, Fairness and Excellence in Australian Higher Education, Australian Government, May 2016.

## 4.2 Create a more coherent and connected system

The current uneven approach between VET and higher education in particular reflects an ongoing failure to conceive of the two as part of a single tertiary education system. Governments have been reluctant to make definitive decisions about whether an integrated system is the best way to support quality provision.

A Business Council of Australia report noted preparation for the jobs of the future requires all of the education and training sectors to operate as one system.<sup>29</sup> This continues to act as a barrier to the creation of the responsive, integrated education and training system required to sustain economic growth in a changing world.<sup>30</sup>

The Bradley Review highlighted that the efforts to strengthen the connections between higher education and VET have only had limited success. This is due to structural rigidities and differences in curriculum, pedagogy and assessment.<sup>31</sup>

Given the wide range of learner needs it is necessary to provide diversity in tertiary provision. This means that the two sectors need to remain distinct given their different educational offerings and roles. What is required is a better connection between the sectors rather than actual integration. As the Bradley Review reported:

“it is also vital that there should be better connections across tertiary education and training to meet economic and social needs which are dynamic and not readily defined by sectoral boundaries.”<sup>32</sup> (Bradley Review)

In addition to increased coherence, there is a need for greater flexibility to meet the increasing demand for higher-order skills, to be more responsive to the needs of students and to accommodate providers operating across state or sectoral boundaries.

To achieve this there needs to be parity of esteem across the sectors. This is the notion that higher education and VET are different but equal. Australia has been down this path before at the time of the establishment of the Committee on the Future of Tertiary Education (Martin report) in 1964.<sup>33</sup> At that juncture, tertiary education was defined by qualification level, specifically, diploma and above. The binary structure consisted of universities and colleges of advanced education, the latter providing more vocationally oriented programs. This was in a sense, the first step towards mass tertiary education. However, this approach soon dissolved. There is a new binary system today with a dominance by higher education over VET in terms of expanding levels of participation and funding. It is very much a case of different but unequal. This lack of parity of esteem is also driven by the perception that VET is lower than higher education due to the status of occupations that the sectors largely serve.<sup>34</sup>

### KEY FINDING

**While recognising the distinctive features of higher education and VET there is a need for a more coherent and connected tertiary education system to be established.**

---

<sup>29</sup> *Future-Proof: Protecting Australians through education and skills*, Business Council of Australia, October 2017.

<sup>30</sup> Pilcher and Torii, *The vocational education and training sector is still missing out on government funding*

<sup>31</sup> *Review of Australian Higher Education, Final Report, December 2008.*

<sup>32</sup> *Review of Australian Higher Education, Final Report, December 2008.*

<sup>33</sup> *Committee on the Future of Tertiary Education in Australia 1964 - 65, Tertiary education in Australia: report to the Australian Universities Commission (the Martin Report)*, Commonwealth of Australia, Melbourne.

<sup>34</sup> Beddie F., *What next for tertiary education?*, NCVER, Commonwealth of Australia, 2014.

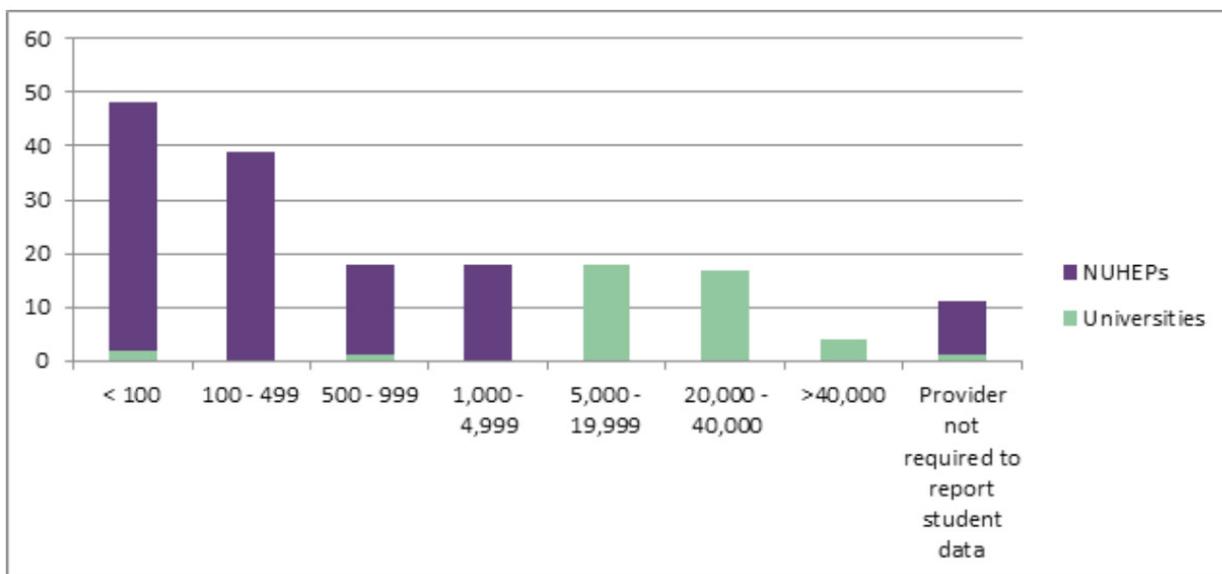
### 4.3 Adjust the shape of tertiary education

There is a general consensus that institutional differentiation is desirable as more diverse systems:

- > Are required for the diversity of student needs;
- > Are better equipped to encourage social mobility;
- > Are better linked to labour markets that increasingly require different types of graduates; and
- > Enable more cost effective delivery of education and research.<sup>35</sup>

On the surface it appears that Australia has substantial institutional diversity. There are over 5,000 Registered Training Organisations offering VET, some of these are classified as dual sector operators and there are over 170 public and private higher education providers. Universities have the most higher education students but are in a minority of higher education providers. In addition, there is a growing number of Non-University Higher Education Providers (NUHEP) although the majority of these have less than 500 students. However, in practice there is little diversity. Over 90 per cent of higher education students study at one of the 40 Australian research universities.<sup>36</sup>

**Chart 11: Higher education providers by size and student load (EFTSL), 2013**<sup>37</sup>



In a sense it is necessary to consider that notion of a mass higher education system organised to distinguish between the education for the workforce on one hand and the encouragement of excellence in research on the other.<sup>38</sup> There is a need for an agreed definition of higher education that takes account of the advanced level of skills and analytical thinking typically associated with VET and increasingly required by all Australians.

There may well be a need to break away from institutional legacies. Perhaps the provision landscape needs to be broader to embrace options such as non-research based universities, polytechnic universities and other categories.<sup>39</sup>

<sup>35</sup> Goedegebuure L, Massaro V, Meek L and Pettigrew A: A Framework for Differentiation, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>36</sup> French S, Lilly P and James R: *Future for Australian Tertiary Education: Developing an Integrated, Coherent Policy Vision*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>37</sup> *Higher Education in Australia: A review of reviews from Dawkins to today*, Commonwealth of Australia, 2015.

<sup>38</sup> Beddie F, *A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities*, NCVER Research Report, Commonwealth of Australia, 2014.

<sup>39</sup> Griew, R.; *Three Lessons from a decade of higher education policy stalemate*, The Nous Group, 2018.

### 4.3 ADJUST THE SHAPE OF TERTIARY EDUCATION

In Canada, for example, post-secondary education includes an extensive college system producing graduates of non-university education. This former group of trade and vocational oriented colleges now provides professional education comparable to what in Europe would be applied universities.<sup>40</sup>

The necessary landscape can be viewed as an ecosystem.

*“Rather than the present bifurcated, incoherent model, imagine Australia with a tertiary education ecosystem where the student is able to self-organise an ensemble of modular courses and experiences integrated across the vocational and higher education spectrum, tailored to their needs and desires. Boundaries between vocational and higher education would need to become increasingly porous.”<sup>41</sup>*

There are many factors indicating the need for structural change. Some of these are historically familiar but there are also new ones. These include the way information is disseminated and knowledge is produced, the global employment market and the international education industry.<sup>42</sup> Another consideration is the need for both higher education and VET institutions to develop partnerships with industry to ensure fast changing skill needs are met.

There has been a blurring of boundaries between school, VET and universities but this has not resulted in real institutional diversity in the tertiary education system. Some of this blurring is the result of competition over funding as universities encroach on the diploma market and some TAFE institutes and other providers now offer degrees.<sup>43</sup>

## KEY FINDING

---

*Given the increasing diversity of learner needs it is desirable to have a greater variety of provider types within the tertiary education system.*

---

<sup>40</sup> Usher, A.; What makes Canada unique in post-secondary education? Higher Education Strategy Associates, 27 April 2018.

<sup>41</sup> Gallagher S. Future of tertiary education: across a spectrum of learning, The Australian, March 14, 2018.

<sup>42</sup> Beddie F., A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities, NCVER Research Report, Commonwealth of Australia, 2014.

<sup>43</sup> Beddie F., What next for tertiary education?, NCVER, Commonwealth of Australia, 2014.

## 4.4 Facilitate movement between institutions

It has been long recognised that an important feature of a post-secondary education system is the ability of students to move from one sector to another.<sup>44</sup> This transfer can occur in both directions although the most commonly referenced direction is from VET to higher education. Student transfer is the enrolment of a student in a program in one tertiary sector after having been enrolled in the other.<sup>45</sup> It is important in this context to not view the role of VET as a feeder for higher education – VET has a much broader role than this.

There are persistent barriers to transfer between higher education and VET. These include:

- > Incompatibilities in curriculum;
- > The lack of enforceable policies on credit transfer; and
- > Suspicion about the standards of TAFE colleges and other non-traditional tertiary education providers.<sup>46</sup>

The inability to achieve successful movement between sectors once again raises the issue of the parity of esteem. A significant cause of the problem remains the institutional structures. While recent data is difficult to obtain it is clear that there is relatively little movement by students between the two sectors. In 2005 the Ministerial Council on Employment, Education, Training and Youth Affairs provided guidelines to promote VET to higher education transfer and commissioned national research into ways of improving credit transfer and articulation.<sup>47</sup>

The transition from VET to higher education is often complicated despite the fact that policies – such as credit transfer, articulation arrangements and recognition of prior learning – have been put in place to facilitate transitions between the two sectors.<sup>48</sup> NCVER reported that in 2010 around 7 per cent of commencing domestic equivalent full-time students had completed a VET course prior to commencing higher education. An additional 1.4 per cent had an incomplete VET course.<sup>49</sup>

There are two main periods of transfer: during the initial transition from education to work (up to 25 years of age) and later life transfer. In the first period it has been estimated that 9 per cent of university commencers subsequently enrol in VET qualifications and 10 per cent of VET commencers transfer to university.<sup>50</sup> In the second period university graduates account for 7 – 10 per cent of VET students aged over 25 years. The proportion of VET students with a university degree (10 per cent) was smaller than the proportion of university students with a VET qualification (16 per cent) in 2007. Given the VET system enrolls many more students the total numbers of VET students with a university degree is greater than the number of university students with a VET qualification.<sup>51</sup>

There is further difficulty for disadvantaged students seeking access to higher education from VET. Some research indicates pathways between the sectors had deepened the participation of social groups that were already well represented, but it had not widened the participation of those groups who are underrepresented. It was therefore suggested that articulation in its current form is not an effective mechanism for increasing the participation of students with low socioeconomic status backgrounds.<sup>52</sup> Regardless of the quantum movement in either direction, it is clear that the movement is small and that there are barriers to overcome.

---

<sup>44</sup> Beddie F., *A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities*, NCVER Research Report, Commonwealth of Australia, 2014.

<sup>45</sup> Curtis, D, *Student transfer: at a glance*, NCVER, Adelaide, 2009.

<sup>46</sup> Beddie F., *A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities*, NCVER Research Report, Commonwealth of Australia, 2014.

<sup>47</sup> Curtis, D, *Student transfer: at a glance*, NCVER, Adelaide, 2009.

<sup>48</sup> Griffin T, *Disadvantaged learners and VET to higher education transitions*, NCVER, 2014.

<sup>49</sup> *Australian vocational education and training statistics: tertiary education and training in Australia 2010*, NCVER, Adelaide, 2012.

<sup>50</sup> Curtis, D, *Student transfer: at a glance*, NCVER, Adelaide, 2009.

<sup>51</sup> Curtis, D, *Student transfer: at a glance*, NCVER, Adelaide, 2009.

<sup>52</sup> Wheelahan, L, *What kind of access does VET provide to higher education for low SES students? Not a lot*, University of South Australia, Adelaide, 2009.

Research indicates that although Australia has a set of national policies to promote student pathways from vocational to higher education, there are substantial differences between universities in the proportion of undergraduate commencing students they admit on the basis of a VET award. While the proportion of students admitted on the basis of a VET award nationally is now around 10 per cent, some universities admit VET award holders at well over twice this rate, whereas others admit negligible numbers. Twelve universities enrol 68 per cent of all students admitted to undergraduate programs on the basis of a VET award. In other words, one-third of Australian universities provide two-thirds of the VET to higher education pathways. These differences are due primarily to the policies and practices of universities rather than to the characteristics of VET award holders or differences between fields of study.<sup>53</sup>

In order to make a successful transition from VET to higher education students require access to support. Enablers to assist this process have been identified as the inclusion of articulation as part of the program design, access to consistent and accurate promotional material, easier and fairer processes of articulation and recognition of prior learning and university staff understanding vocational education and training and vice versa.<sup>54</sup>

### **KEY FINDING**

*Given the low volume of student transfer between higher education and VET there is a need for a model that includes more systematic methods to facilitate movement between the sectors.*

---

<sup>52</sup> Wheelahan, L, 'What kind of access does VET provide to higher education for low SES students? Not a lot', University of South Australia, Adelaide, 2009.

<sup>53</sup> Watson L., Hagele P. and Chesters J; A half-open door: pathways for VET award holders into Australian universities, NCVWR, 2013.

<sup>54</sup> Aird, R, Miller, E, van Megen, K & Buys, L, Issues for students navigating alternative pathways to higher education: barriers, access and equity: a literature review, Queensland University of Technology and Griffith University, Brisbane, 2010.

## 4.5 Establish new governance arrangements

The key challenge in relation to the governance of the tertiary education system is to determine the respective roles of the levels of government and the place of industry. There is a range of views in relation to this. It has been argued that central planning approaches are rigid and cumbersome and that tertiary education best thrives in a decentralised and autonomous environment.

This should not be equated with an absence of responsibility and accountability and that this can be achieved through a series of performance agreements.<sup>55</sup>

Consideration needs to be given to the issue of an independent co-ordinating agency. In tertiary education this role was formerly performed by the Commonwealth Tertiary Education Commission (CTEC) from 1942 to 1988 and then a more Commonwealth Department style model through the National Board of Employment, Education and Training (NBEET). Ultimately NBEET was compromised by current government policy and placed the Commonwealth Minister too close to the operational elements of the system.

For policy coherence an independent co-ordinating agency is required to engage in consistent, continuous and longer-term strategy development. This would need to be led by a board comprising representatives from key industry and societal sectors to ensure the articulation of views needed for the effective development and monitoring of a national tertiary education strategy.

An independent co-ordinating agency and any resulting national strategy requires the inclusion of both higher and vocational education.

“It is impossible to envision a cost-effective system focused on delivering knowledge and skills to increasing numbers of Australian and international students without considering regional delivery, thin markets and the increased blurring of the higher-vocational education divide.”<sup>56</sup>

Any governance arrangements need to take account of the current differing responsibilities of Federal and State governments. In addition to potential policy roles, this involves consideration of funding and regulation issues. The Bradley Review recommended that the Australian government take primary responsibility for the broad tertiary education and training system in Australia.<sup>57</sup> More recently a key response to this was the call by the Business Council of Australia to establish a single funding model that was sector neutral and a split of funding responsibilities according to qualification levels.<sup>58</sup> This was to be supported by the establishment of a post-secondary education and skills system funding and market information institution. The Council has subsequently confirmed that post-secondary education and skills should be a shared responsibility but with greater clarity about these responsibilities.<sup>59</sup>

Another view is that administrative and governance arrangements need to be managed within the context of a COAG level agreement with the establishment of an expert advisory body to provide advice at arm’s length from governments.

This body would have responsibilities for:

- > advising on resourcing to meet changing demand,
- > maintaining neutrality of provider and student choice between higher education and VET,
- > monitoring delivery profile against changing demographics and labour market needs.<sup>60</sup>

<sup>55</sup> Goedegebuure L, Massaro V, Meek L and Pettigrew A: *A Framework for Differentiation*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>56</sup> Goedegebuure L, Massaro V, Meek L and Pettigrew A: *A Framework for Differentiation*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>57</sup> *Review of Australian Higher Education, Final Report*, December 2008.

<sup>58</sup> *Future-Proof, Protecting Australians Through Education and Skills*, Business Council of Australia, October 2017.

<sup>59</sup> *Future-Proof, Australia’s Future Post-Secondary Education and Skills System*, Business Council of Australia, August 2018.

<sup>60</sup> Croucher G, Noonan P and Chew J.: *Funding an expanded tertiary system: designing a coherent financing architecture*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

Within this context it is important to avoid assumptions that the VET and higher education sectors are the same and to avoid approaches that encourage homogeneity. It is also important that financing systems do not encourage sector drift and, in particular, the States and Territories should not diminish VET where they hold ultimate responsibility. This would not mean the establishment of a single funding formula but rather that “financing decisions and mechanisms across VET and higher education should share a common logic and approach where appropriate.”<sup>61</sup>

The issue of the governance of the system is heavily influenced by funding considerations. With the introduction of demand-driven funding mechanisms in both VET and higher education clear policy direction is often lost in the highly competitive chase for funding dollars. The governance structure needs to be more than a vehicle for distributing finance if it is to avoid the errors of the past.

### **KEY FINDING**

---

*Establish an independent coordinating body charged with the responsibility of delivering government policy in a more coherent manner.*

---

<sup>61</sup> Melbourne CSHE, February 2017.

## 4.6 Establish equitable funding arrangements

The development of a binary model with significant increased expenditure for higher education on the one hand and decreasing expenditure for VET on the other, is now well established. In addition, the configuration of the Commonwealth education and training portfolios at ministerial and department level also reflects this divide. This makes it difficult to maintain a more integrated oversight of tertiary education policy, funding and programs.<sup>62</sup>

While the Commonwealth has become the dominant funder of tertiary education there is little likelihood that the Commonwealth would assume full responsibility for funding VET. Similarly, the prospect of a unified funding system for both sectors, regardless of its particular merits, has little prospect of success. Accordingly, a national tertiary funding system will need to incorporate the states and territories in a shared funding model. This needs to be a more effective model than what currently exists. To govern this there is an argument for an independent overarching body to address whole of sector functions. These include:

- > Assessment of need and demand including the balance of growth between the two sectors,
- > Advice to government on future resourcing needs flowing from this assessment,
- > Monitoring of advice on fiscal sustainability,
- > Pricing principles and methodology, and
- > Administration of student loan schemes.<sup>63</sup>

Other bodies would be able to administer more sector specific requirements. In the higher education sector this would include making adequate provision for the distinctions between teaching and research.

The first priority is to address the decline in participation and funding in the VET sector and to restore a better balance between higher education and VET. There have been some indications that there may well be an oversupply of some higher education graduates in some fields. The demand-driven funding system has been more responsive to the labour market than previous mechanisms. Skills shortages for professional occupations have been reduced to only five occupations. On the other hand, there are thirty technical and trade occupations currently in skill shortage which could be addressed by a re-invigorated VET system.<sup>64</sup>

In higher education there is the further complication of public funding for research. It would not be desirable to establish funding models that elevate research above teaching and so a differentiated funding model is required. Some of the increase in research funding has been the result of subsidies through the expansion of student numbers. The Commonwealth Grant Scheme currently provides universities with flexibility in this regard. While separating teaching and research funding may seem appealing, a significant number of staff and facilities support both. Splitting the main university grant to target funds at two ostensible outcomes may cause a loss of university effectiveness.<sup>65</sup> There is a need to explicitly support research infrastructure without deepening any teaching - research divide.<sup>66</sup>

### KEY FINDING

***A key function of an independent coordinating body would be to establish equitable funding arrangements across the sectors and between levels of government.***

---

<sup>62</sup> Noonan P., *A new system for financing Australian tertiary education*, Mitchell Institute, September 2016.

<sup>63</sup> Noonan P., *A new system for financing Australian tertiary education*, Mitchell Institute, September 2016.

<sup>64</sup> Norton A., *To fix higher education we also need to fix vocational education*, *The Conversation*, September 5, 2018.

<sup>65</sup> King C., *Towards a tertiary future*, IRU Discussion Paper, November 2018.

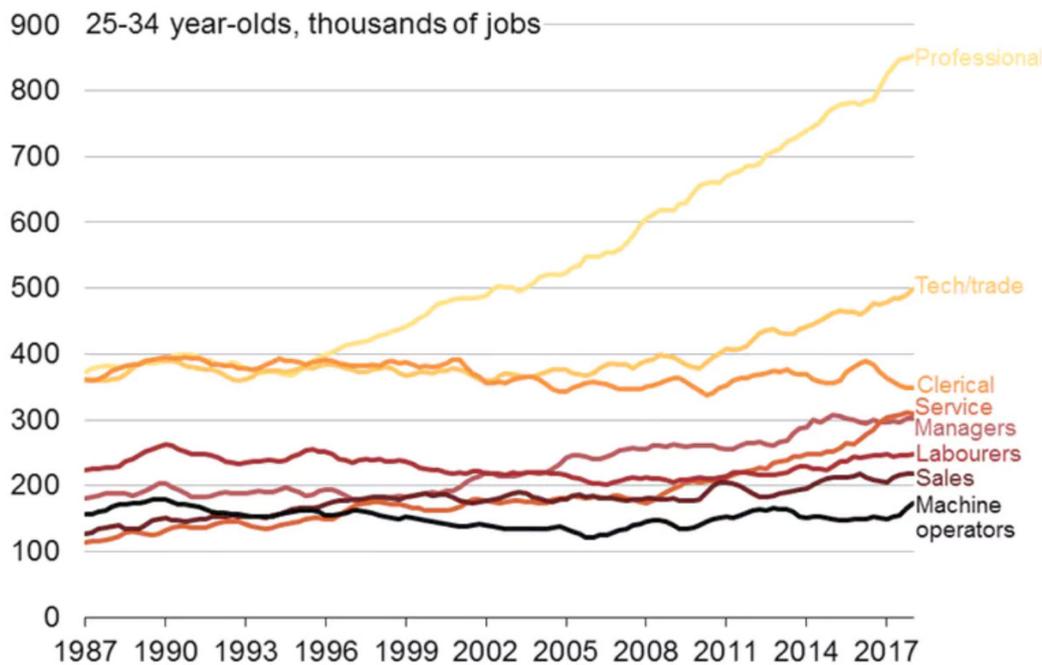
<sup>66</sup> Beddie F., *What next for tertiary education?*, NCVER, Commonwealth of Australia, 2014.

## 4.7 Improve demand-driven funding mechanisms

The move to the demand-driven system for higher education was announced in 2009. This enabled universities to enrol and receive funding for unlimited numbers of bachelor degree students. Enrolment grew at 6 per cent in the initial transition years up to 2012. After the full introduction of demand-driven funding government supported places grew by 5.2 per cent in 2013, 3.6 per cent in 2014, 1.6 per cent in 2015 and 1.5 per cent in 2016.<sup>67</sup> The Government's decision to freeze Commonwealth Grants Scheme (CGS) funding at 2017 levels has effectively ended the demand-driven system even though the growth in the number of student places had already plateaued.

One of the criticisms of the demand-driven funding system was that it produced an over-supply of graduates who subsequently experienced difficulty finding employment. In 2014 short-term graduate employment outcomes were the worst on record with nearly a third of graduates unable to find full employment.<sup>68</sup> Nevertheless the long-term ABS data indicates significant growth by young people in professional occupations. In the last decade the employment of professionals has increased by 35 per cent in the context of an overall employment growth of 17 per cent.<sup>69</sup>

**Chart 12: Employment of 25 - 34 year olds by occupational category 1987 - 2017 ('000)**



Occupational trends, 1987-2017. ABS

The demand-driven funding system is more responsive to the labour market than the system of fixed annual grants. The skills shortage data provided by the Commonwealth indicates that there were 40 professional occupations listed in 2008 prior to the introduction of demand-driven funding. By 2016 - 17 this had reduced to five occupations.<sup>70</sup>

State and Territory governments developed various entitlement arrangements as part of the National Partnership for Skills Reform from 2012-13 to 2016-7. These arrangements were not designed to be able to match the national demand driven funding system for higher education and have settled on a more demand-managed system approach.<sup>71</sup>

### KEY FINDING

**Given the more effective responsiveness to the labour market demand-driven funding mechanisms need to be retained and improved in tertiary education.**

<sup>69</sup> The Skilled Labour Market 2016 - 17 at [www.employment.gov.au/skill-shortages](http://www.employment.gov.au/skill-shortages)

<sup>70</sup> The Skilled Labour Market 2016 - 17 at [www.employment.gov.au/skill-shortages](http://www.employment.gov.au/skill-shortages)

<sup>71</sup> Bowman K and McKenna S., *Jurisdictional approaches to student training entitlements: commonalities and differences*, NCVET, November 2016.

## 4.8 Create equitable student contributions

*“There is a strong argument for a common loans scheme across higher education and upper level VET qualifications to remove distortions in decisions by students about what and where to study and to minimise the disincentive effects of up-front fees.”* (Bradley Review)

This admirable aim was followed by a loans scheme for the VET sector, but different to the higher education scheme. This became the much-maligned VET FEE HELP scheme which was extensively rorted and subsequently replaced by the VET Student Loans scheme from the beginning of 2017. Accordingly, the opportunity to introduce a common scheme has been missed to this point in time. Although the new approach is similar given the disclosure of subsidies into three levels of specific funding.<sup>72</sup>

There is universal agreement that students need to contribute to the cost of tertiary education. The issues relate to the extent and form of this contribution. In terms of higher education, students pay on average 40 per cent of the course fee which means a university receives this from the student for a Commonwealth Supported Place and the remainder is funded by government.

The amount varies considerably according to the discipline studied. This total amount does not cover the full cost of delivering a university degree, as the government contributes funds through additional schemes.

The current government has proposed a set of reforms including reducing the proportion of the government contribution and raising the amount that a student would pay.<sup>73</sup> Indeed, the 2014 Report of the National Commission of Audit recommended to the government that the proportion of costs paid by the Commonwealth through the Commonwealth Grants Scheme be reduced from 59 per cent to 45 per cent and the cost paid by students increase from 41 per cent to 55 per cent.<sup>74</sup>

There are inconsistencies in eligibility criteria for a student loan across the two sectors. All undergraduate students at Australian public universities have access to stable Commonwealth subsidies and HELP. In the VET sector, students undertaking advanced diplomas may or may not have access to an often variable State subsidy or VET student loan. Similarly, VET students in Certificate courses face upfront fees and cannot access the VET Student Loans program. The different levels of public subsidy and access to student loans programs have made accessing higher education loans more attractive.<sup>75</sup>

The significant expansion of higher education following the introduction of demand-driven funding has led to an increase in the HELP debt. The value of the outstanding HELP debt has increased from

\$12.4 billion in June 2006 to over \$47.8 billion in June 2016. Projections to 2025 indicate a total of nearly \$200 billion.<sup>76</sup>

---

<sup>72</sup> <https://www.education.gov.au/vet-student-loans>

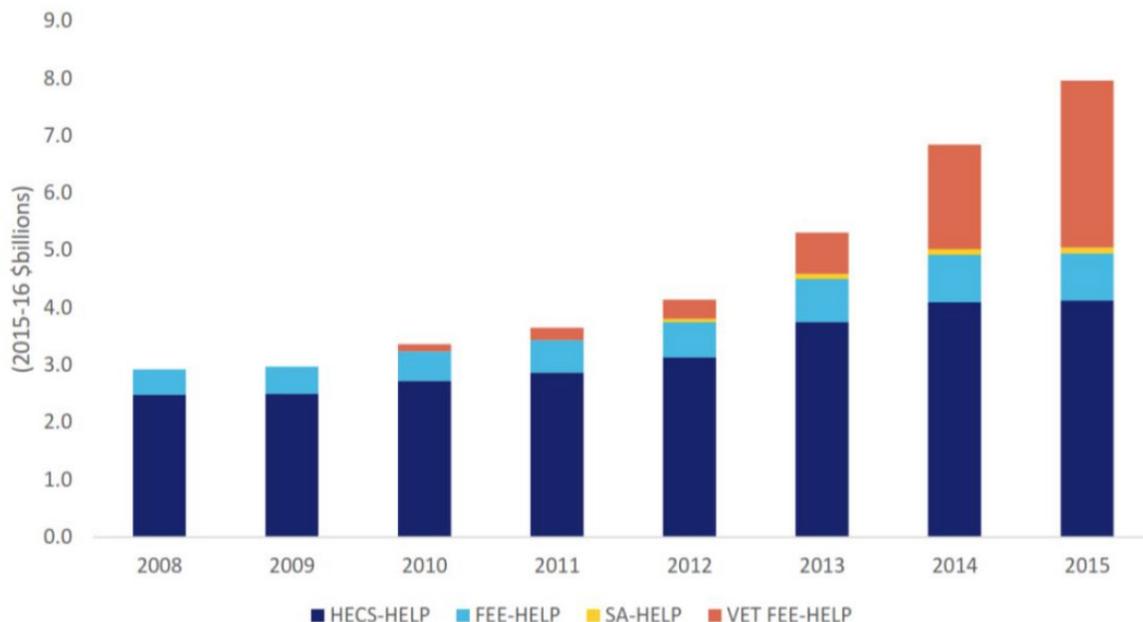
<sup>73</sup> <https://theconversation.com/fact-check-what-do-students-contribute-to-their-own-degrees-27280>

<sup>74</sup> *Higher Education in Australia: A review of reviews from Dawkins to today*, Commonwealth of Australia, 2015.

<sup>75</sup> Croucher G., Noonan P. and Chew J.: *Funding an expanded tertiary system: designing a coherent financing architecture*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>76</sup> *Shifting the Dial: 5 year productivity review*, The Productivity Commission, 2017.

**Chart 13: Higher Education Loan Program (HELP) payments 2008 - 2015**

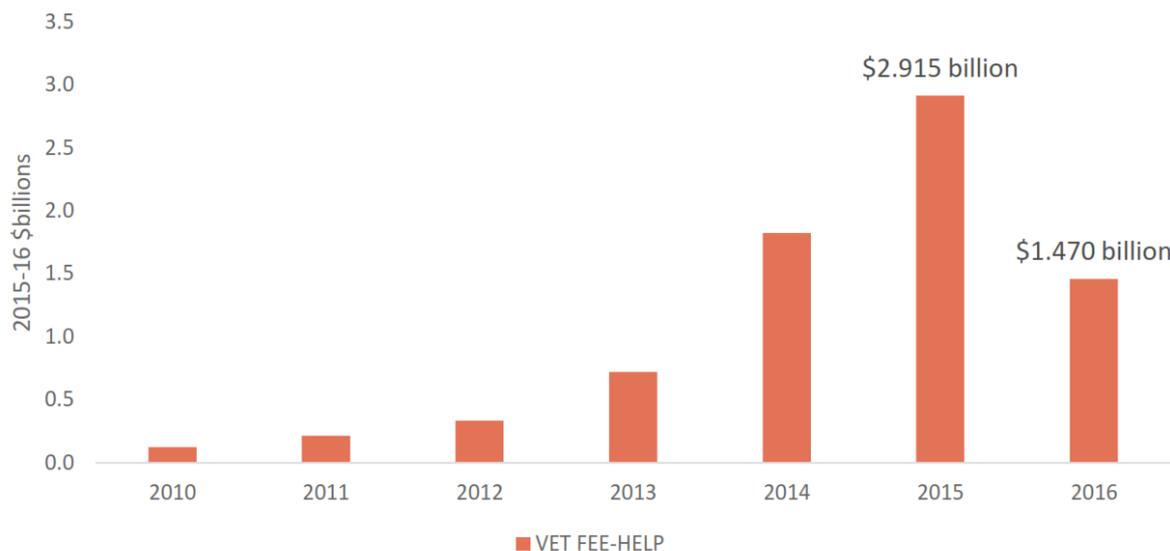


Source: Commonwealth Department of Education and Training 'Financial Reports of Higher Education Providers' (multiple years) and 'VET FEE-HELP Statistical Report' (multiple years)

In addition to the level of the debt there is the concern about expenditure for bad or doubtful debts. The 2017 - 2018 Federal Budget lowered the repayment threshold in an attempt to reduce costs.

The VET FEE-HELP scheme was introduced in 2009 and grew sharply until 2015. Quite apart from the misuse of the scheme by some providers the cost of the scheme to the government reached \$2.915 billion in 2015. As a result of changes and reforms this expenditure was reduced to \$1.470 billion in the following year.<sup>77</sup>

**Chart 14: VET FEE HELP payments 2010 - 2016**



Source: 'VET FEE-HELP Statistical Report' (multiple years)

<sup>77</sup> Pilcher S. and Torii K., Expenditure on education and training in Australia 2017, Mitchell Institute, December 2017.

#### 4.8 CREATE EQUITABLE STUDENT CONTRIBUTIONS

The creation of the Skilling for Australians Fund includes targets for the provision of higher apprenticeships.<sup>78</sup> There is a potential opportunity for the off-the-job higher level VET (AQF levels 5 and 6) apprenticeships being financed under the VET Student Loans scheme. This would provide a potential point of differentiation for those providers approved to deliver VET Diplomas and Advanced Diplomas via apprenticeship mode and so support growth in this area. This arrangement would demonstrate an example of integrated policy, practice and funding that would benefit the VET sector.<sup>79</sup>

### KEY FINDING

---

*Establish a universal tertiary education student loan scheme, initially for diploma and above courses, to create a more equitable and cost-effective system.*

---

<sup>78</sup> <https://www.education.gov.au/skilling-australians-fund>.

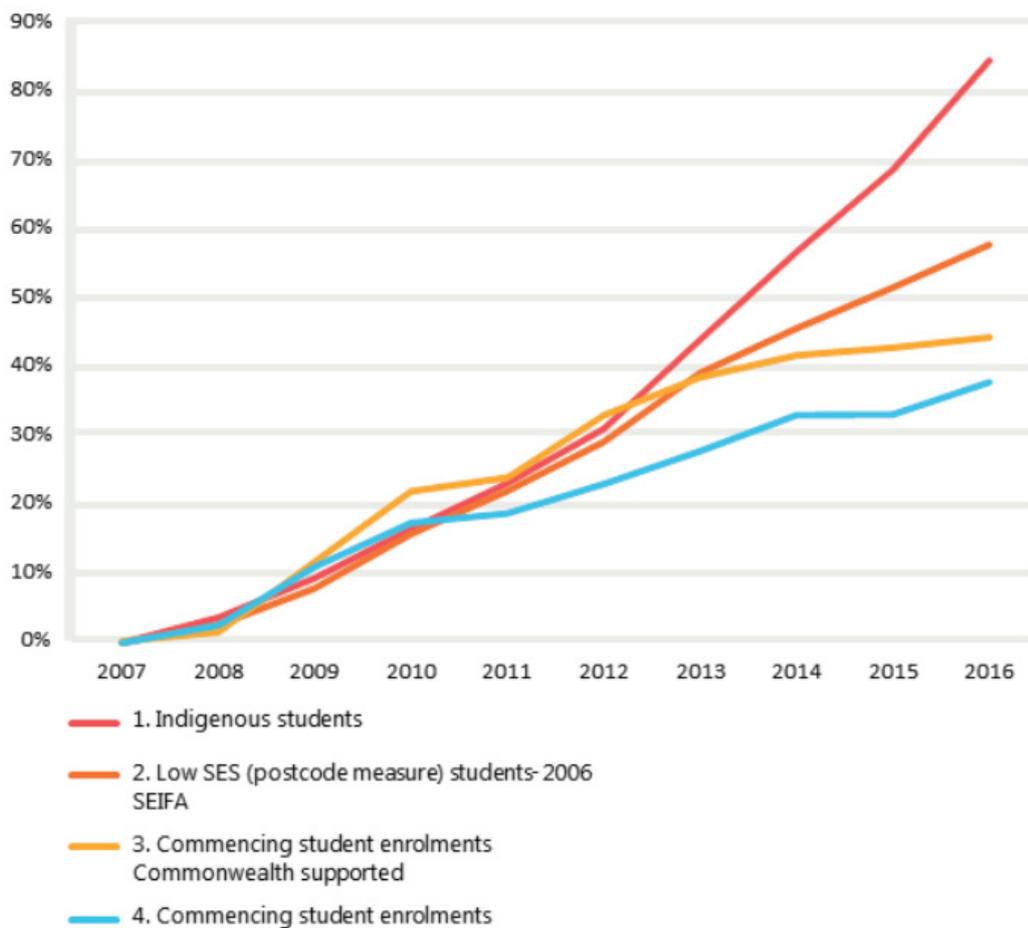
<sup>79</sup> Fowler C and Korbel P, *Exploring higher level VET apprentices and VET student loans*, unpublished paper.

## 4.9 Improve nationally consistent quality

The Bradley Review recommended the formation of a national regulator for higher education. Since the Tertiary Education Quality and Standards Agency (TEQSA) was introduced it has played a key role regulating against explicit industry standards and has become a strong presence in the sector.

The rapid expansion of the sector has led to issues around the maintenance of quality provision. Increased participation has fuelled concerns that new entrants will be under-prepared and under-informed students which could add to attrition rates.

**Chart 15: Rapid rise in low SES and Indigenous student numbers (2007 - 2016)** <sup>80</sup>



Source: Commonwealth Department of Education and Training, 'Selected Higher Education Statistics - Time Series Data 2016', 25 October 2016

The majority of Australian VET providers are regulated through the national VET regulator, the Australian Skills Quality Authority (ASQA). However, there are two other regulators: the Victorian Registration and Qualifications Authority (VRQA) and Western Australia's Training Accreditation Council (TAC). This complicates the achievement of a simplified governance structure.

<sup>80</sup> Cited in Robert Griew, *Three lessons from a decade of higher education policy stalemate*, nous, 2017.

<sup>81</sup> See for example Callan and Bowman, *Lessons from VET providers delivering degrees*, NCVET, 2015.

<sup>82</sup> NCVET Submission to Business Council, 19 January 2018.

<sup>83</sup> *Future-Proof, Australia's Future Post-Secondary Education and Skills System*, Business Council of Australia, August 2018.

The existence of different regulators for both sectors is problematic for providers operating in both systems because of the increased regulatory burden. This does little to promote diversity of providers across the sectors. As a consequence, there have been advocates for a single regulatory body for Australian VET and higher education to decrease this burden and to enable a more diverse training market.<sup>81</sup> While this appears to be a neat solution there are several difficulties and challenges associated with this, including pedagogical and industry relations challenges. Perhaps a more effective approach is to retain TEQSA and ASQA while developing common or joint functionality in data standards, ICT systems, a national unique student identifier and staff exchanges.<sup>82</sup>

The Business Council in its paper addressing post-secondary education states that both ASQA and TEQSA should continue to regulate their respective sectors and should have powers to suspend operations where warranted to protect consumers.<sup>83</sup>

Concern about transparency issues is currently being addressed through the introduction of the Quality Indicators for Teaching and Learning (QILT). Measures such as these mean that there is a growing focus on accountability, transparency and quality assurance as a central feature of the system in the future.<sup>84</sup>

## KEY FINDING

---

*Maintain both TEQSA and ASQA as respective regulators for their systems while establishing joint functionality in appropriate and agreed areas.*

---

<sup>84</sup> French S, Kelly P and James R: *Future for Australian Tertiary Education: Developing an Integrated, Coherent Policy Vision*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

## 4.10 Resolve tension at the borders of the sectors and training for para-professional occupations

The tension between both sectors is fully realised at the borders between the two – specifically, VET diplomas at AQF level 5 and advanced diplomas and associate degrees at AQF level 6.

The demand-driven policy for higher education undergraduates has provided universities with greater market power. While the jurisdictions have introduced various kinds of VET entitlement arrangements they do not match the national demand-driven system implemented for universities. This situation will be aggravated further if the proposed higher education reform of extending the demand-driven policy to sub-bachelor programs and non-university providers is introduced as recommended by the 2014 Review of the Demand Driven Funding System (Kemp – Norton Review). This review found that private universities and NUHEP play an important role in the provision of sub-bachelor courses and this exclusion from access to demand driven funding inhibits competition.

The NCVER has noted that “policy and incentives need to ensure the equitable funding of mid-level professionals, including, for example, Associate Degrees and the newly emerging higher apprenticeships.”<sup>85</sup> While the new VET Student Loans program represents a Commonwealth investment in VET Diplomas this is unlikely to challenge the competitive advantage held by higher education for diplomas.<sup>86</sup>

What is required for para-professional qualifications and occupations is a coordinated structure that does not encourage competition but rather rewards partnerships within the system. There are examples of cooperation and partnerships by providers from both sectors, but the arrangements are typically difficult to establish. As noted in parliamentary debate:

“there is a growing interaction between professional and technical learning, between theory-based, experiential, and competency-based learning, and the blurring of boundaries between them. Businesses have a requirement for both university-educated professionals and VET-trained technicians. It is no longer helpful to see stark contrasts between higher education and VET in the level and types of learning and qualifications they deliver.”<sup>87</sup>

This is the type of thinking that led to the establishment of the Ai Group managed pilot program for higher apprenticeships in concert with Siemens Ltd and Swinburne University of Technology. This innovative model meets a specific emerging business need by combining a VET Diploma with a higher education Associate Degree in Applied Technology delivered in apprenticeship mode. It is interesting to note that the provider is a dual sector provider which makes the necessary collaboration easier to achieve.<sup>88</sup>

### KEY FINDING

*There is a need for greater and more equitable policy and funding coherence for mid-professional learning where the higher education and VET sectors overlap.*

<sup>85</sup> NCVER Submission to Business Council, 19 January 2018.

<sup>86</sup> Fowler, C., *The boundaries and connections between the VET and higher education sectors: confused, contested and collaborative*, NCVER, 2017.

<sup>87</sup> Cited in Fowler, C., *The boundaries and connections between the VET and higher education sectors: confused, contested and collaborative*, NCVER, 2017.

<sup>88</sup> [https://cdn.aigroup.com.au/Reports/2018/Industry\\_4\\_Higher\\_Apprenticeship\\_Program\\_July\\_2018.pdf](https://cdn.aigroup.com.au/Reports/2018/Industry_4_Higher_Apprenticeship_Program_July_2018.pdf)

## 4.11 Promote workplace learning as a key delivery component in all post-secondary education

The benefits of workplace learning have been known for some time<sup>89</sup>, including the link to productivity.<sup>90</sup> Education and training programs that include workplace learning are well regarded by employers. The European Commission's twenty guiding principles for WBL, provide a solid framework for workplace collaboration in all education and training sectors.<sup>91</sup>

The most structured of these arrangements, apprenticeships and traineeships, are accordingly highly valued by employers in many economies. What is required is a world class apprenticeship system that delivers quality technicians and trade workers with expanded coverage into para-professional occupations and delivery of higher-level skills including degree qualifications.

The value of Work Integrated Learning in higher education courses has achieved more momentum since the introduction of a national strategy to promote the practice.<sup>92</sup> There has been a national mapping exercise to examine good practice and identify issues related to the expansion of work integrated learning.<sup>93</sup> Employers are interested in such programs notwithstanding some of the difficulties to achieve engagement.<sup>94</sup>

The apprenticeship system in the VET sector and Work Integrated Learning in the higher education sector provide a solid basis for workplace learning. What is required is an expansion of these systems and in the case of the VET sector, an expansion to other non-apprenticeship programs.

The proposed Higher Education Reform Package advocates new policy and funding for universities to offer more degrees that include work integrated learning to be up to one sixth of a student's total load.<sup>95</sup>

A further issue relates to the capacity of individual learners to have workplace learning experiences recognised between the different sectors. In order to do this there is a need to "lift the reputation for applied learning by ensuring that all competency-based education embraces conceptual thinking and equips learners to move between the different institutions in the system."<sup>96</sup>

### KEY FINDING

**Promote workplace learning as a recognised key delivery component in all tertiary education.**

<sup>89</sup> See for example <http://www.oecd.org/education/skills-beyond-school/46673531.pdf>

<sup>90</sup> Kis V.: *Work, train, win: work-based learning design and management for productivity gains*, OECD Working Paper 135, May 2016.

<sup>91</sup> *Twenty guiding principles for effective WBL*, European Commission, 2015.

<sup>92</sup> <http://cdn1.acen.edu.au/wp-content/uploads/2015/03/National-WIL-Strategy-in-university-education-032015.pdf>

<sup>93</sup> Sachs J and Rowe A.; *2016 Good Practice Report - Work Integrated Learning*, Australian Government Department of Education and Training, September 2016.

<sup>94</sup> PhillipsKPA; *Engaging Employers in Work Integrated Learning; Current State and Future Possibilities*, September 2014.

<sup>95</sup> Fowler C and Stanwick J: *A chance to be bold and ambitious: make apprenticeships the lynchpin to a better integrated tertiary education sector*, NCVET, 2017.

<sup>96</sup> Beddie F., *A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities*, NCVET Research Report, Commonwealth of Australia, 2014.

## 4.12 Reconsider qualifications

The major outcome from the tertiary education system is the award of qualifications, the recognition of skill and knowledge achievement. Given the rapidly changing nature of the workplace and the subsequent implications for skilling, it is important to reconsider whether Australia is well served by the current qualifications framework. In this sense it is timely that a review of the Australian Qualifications Framework has commenced and may lead to qualification and institutional reforms across the sectoral boundaries of VET and Higher Education.<sup>97</sup>

Preliminary work associated with the review has identified recent developments such as the trend towards micro-credentials and flexible delivery options and mechanisms to assist learners to construct their own programs, sometimes across sectors, to meet individual learning needs. In international terms, some countries are altering the way they view qualifications frameworks. In Europe, for example, there is a movement towards considering qualifications frameworks as a tool to facilitate an agile workforce suited to rapid technological, industrial and social change.<sup>98</sup>

A key issue is whether full qualifications should remain as the main or the only means of recognising skill achievement. This particular issue has been brought into sharp focus by the emergence of micro-credentials mainly in the higher education sector. However, the VET sector has also experimented with sub-qualifications through skill set programs. The impetus behind both of these initiatives is the need for more rapid achievement of skills to reflect change in the workplace. Highly competitive workplaces increasingly require methods of agile skill acquisition.

There is some growing mistrust of the degree as an adequate indicator of suitability for employment.

“An ecosystem of micro-credentials is emerging as an alternative or supplement to the degree, perhaps in tune with employers who have dispensed with degrees as prerequisites for employment on the grounds that degree transcripts are not particularly useful, and that university records are not good predictors of employment success.”<sup>99</sup>

This emerging trend is depicted in the following diagram.<sup>100</sup>

*next page*

---

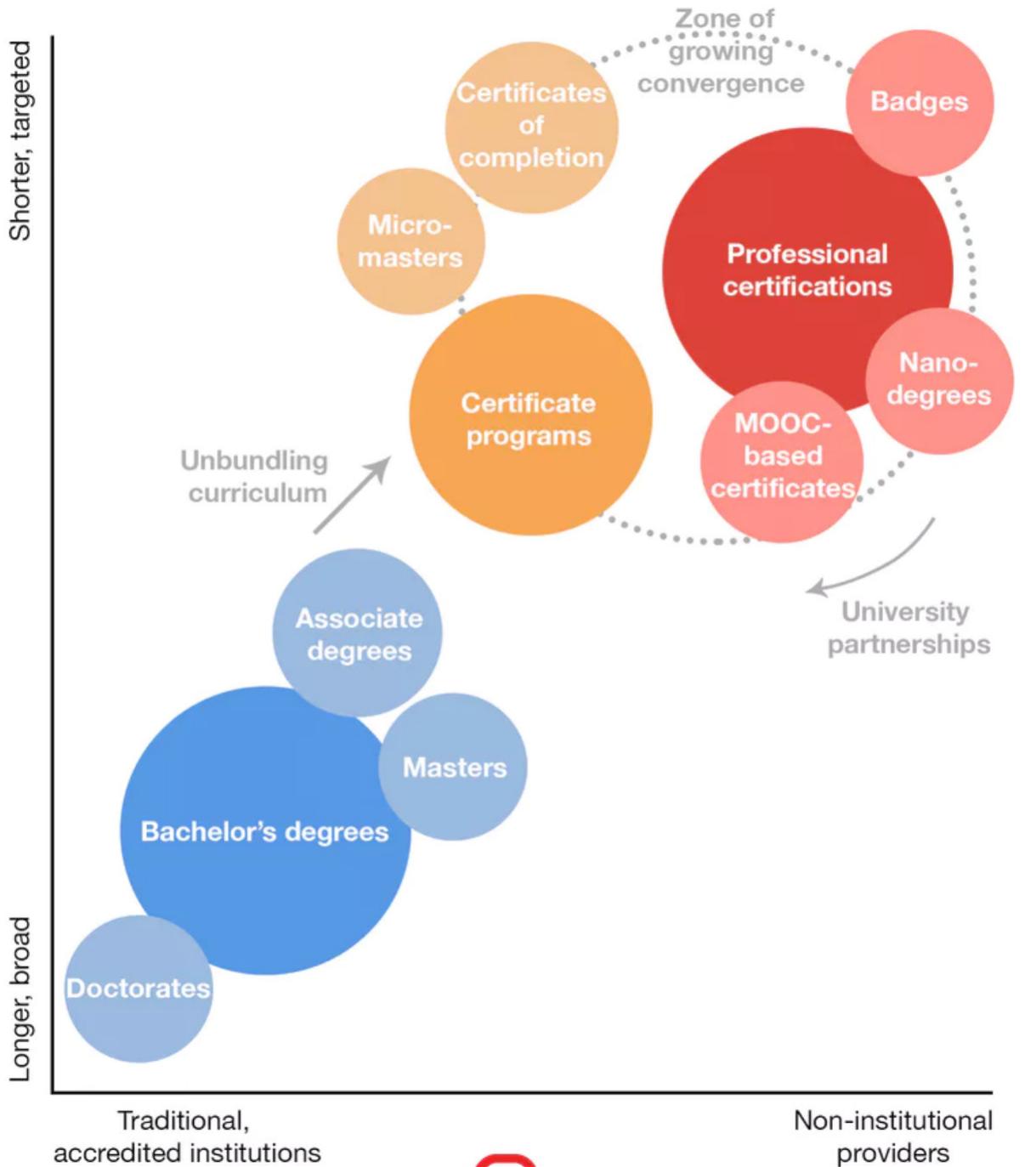
<sup>97</sup> Fowler C and Stanwick J: *A chance to be bold and ambitious: make apprenticeships the lynchpin to a better integrated tertiary education sector*, NCVET, 2017.

<sup>98</sup> *Contextual Research for the Australian Qualifications Framework Review*, PhillipsKPA, April 2018.

<sup>99</sup> Milligan S. and Kennedy G.; *To what degree? Alternative micro-credentialing in a digital age*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>100</sup> Sharrock G., *Six things Labor's review of tertiary education should consider*, *The Conversation*, May 25, 2018.

# The future of credentials?



This ecosystem is possible due to the available digital communications technologies which can be applied for a number of purposes. These include:

- > The provision of credentials that can be aggregated or 'stacked' over time,
- > A mechanism for the general application of the Recognition of Prior Learning,
- > A means of breaking the nexus between teaching and assessing or credentialing,
- > A more effective means of recognising graduate attributes,
- > The provision of a method of professional learning and professional development, and
- > An effective means of learning to maintain various forms of currency.<sup>101</sup>

Micro-credentials have a number of advantages. "Non-institutional credential programs tend to be highly professionally focused, shorter-term, or 'bite-sized' – and as a result, substantially less expensive and more directly connected to job competencies compared to a degree."<sup>102</sup>

There has been substantial growth in the range and number of providers. Continuing on from the web-based providers of Massive Open Online Courses (MOOC), there is a broader range of providers than tertiary institutions. These include for example, new commercial education providers such as Udacity, corporate giants such Google, IBM and Microsoft, and a range of cultural and commercial organisations.<sup>103</sup> Some university providers are also partnering with external companies to enter this market.<sup>104</sup>

This is not to dismiss a number of challenges associated with the introduction and growth of micro-credentials. There is also the issue of how best to recognise this form of learning. In Europe the European Transfer and Accumulation System and the European Credit System for VET are considering portability arrangements for micro-credentials.<sup>105</sup> Closer to home, the New Zealand Qualifications Authority has established a credit mechanism for micro-credentials within their framework following the completion of some pilot programs.<sup>106</sup>

## KEY FINDING

---

***The qualifications structure in Australia needs to be reviewed to consider the emergence of micro-credentials and other developments impacting on the key outcomes of tertiary education.***

---

<sup>101</sup> Milligan S. and Kennedy G.; To what degree? Alternative micro-credentialing in a digital age, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>102</sup> Gallagher S., *Innovative Credentials: Turning a drop in a bucket into a transformative tidal wave*, The Evollution, September 2016.

<sup>103</sup> Milligan S. and Kennedy G.; To what degree? Alternative micro-credentialing in a digital age, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>104</sup> Gallagher S., *Innovative Credentials: Turning a drop in a bucket into a transformative tidal wave*, The Evollution, September 2016.

<sup>105</sup> Milligan S. and Kennedy G.; To what degree? Alternative micro-credentialing in a digital age, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.

<sup>106</sup> [www.nzqa.govt.nz/about-us/consultations-and-reviews/recognising-micro-credentials-in-New-Zealand](http://www.nzqa.govt.nz/about-us/consultations-and-reviews/recognising-micro-credentials-in-New-Zealand)

# 5. CONCLUSION

---

As Australia enters a period of mass tertiary education there are several challenges to provide a highly skilled workforce. These challenges include:

- > Long-term vision and policy: establish a longer-term vision and policy framework for tertiary education rather than a reliance on short-term reviews of elements of the system.
- > More coherent and connected system: while acknowledging differences between higher education and VET it is important to view developments in either sector from the perspective of the whole.
- > Diverse range of effective institutions: reflecting the wide range of learner needs a more genuinely diverse tertiary education landscape is required that features a variation in the types of providers.
- > Learner movement between institutions: to facilitate more agile acquisition of skills and knowledge a more effective system of learner transfer between institutions within the overall sector is required.
- > Improved governance arrangements: new governance arrangements are required to enable sector oversight and the more consistent development of policy.
- > Equitable funding arrangements: funding arrangements across the sector need to be more equitable and support a more comprehensive and coherent funding platform.
- > Demand driven funding mechanisms: these need to be implemented in a collaborative manner that is responsive to industry skill needs and without favouring any particular sector.
- > Common student loans scheme: current student loan schemes are inequitable across the full sector and a universal scheme needs to be introduced.
- > Improved nationally consistent quality: the system needs to move to a single regulator for each of VET and higher education and seek to establish areas of joint functionality.
- > Resolve border tension: there is a need to address inequitable participation and funding arrangements at the intersection of VET and higher education.
- > Promotion of workplace learning: workplace learning needs to be promoted as a vehicle for industry engagement with the system and as a key component of delivery.
- > Reconsideration of qualifications: there is a need to review qualifications as the sector product to determine whether the current framework and arrangements are responding to emergent needs.

This is a formidable list. The need for considered and consolidated change is essential if Australia is to achieve the tertiary education system necessary for skill and knowledge acquisition in the 21st century.

# REFERENCES

---

*Aird, R, Miller, E, van Megen, K & Buys, L, Issues for students navigating alternative pathways to higher education: barriers, access and equity: a literature review, Queensland University of Technology and Griffith University, Brisbane, 2010.*

*Atkinson G and Stanwick J., Trends in VET: policy and participation, NCVET, 2016.*

*Australian Bureau of Statistics 6227.0, Education and Work.*

*Australian vocational education and training statistics: tertiary education and training in Australia 2010, NCVET, Adelaide, 2012.*

*Beddie F., A differentiated model for tertiary education: past ideas, contemporary policy and future possibilities, NCVET Research Report, Commonwealth of Australia, 2014.*

*Beddie F., What next for tertiary education?, NCVET, Commonwealth of Australia, 2014.*

*Bowman K and McKenna S., Jurisdictional approaches to student training entitlements: commonalities and differences, NCVET, November 2016.*

*Committee on the Future of Tertiary Education in Australia 1964 - 65, Tertiary education in Australia: report to the Australian Universities Commission (the Martin Report), Commonwealth of Australia, Melbourne.*

*Croucher G., Noonan P. and Chew J., Funding an expanded tertiary system: designing a coherent financing architecture in Visions for Australian Tertiary Education, Melbourne CSHE, February 2017.*

*Curtis, D, Student transfer: at a glance, NCVET, Adelaide, 2009.*

*Driving Innovation, Fairness and Excellence in Australian Higher Education, Australian Government, May 2016.*

*European Commission, Twenty guiding principles for effective WBL, 2015.*

*Financial information 2017, NCVET, 2018.*

*Fowler, C., The boundaries and connections between the VET and higher education sectors: confused, contested and collaborative, NCVET, 2017.*

*Fowler C and Stanwick J: A chance to be bold and ambitious: make apprenticeships the lynchpin to a better integrated tertiary education sector, NCVET, 2017.*

*French S, Lelly P and James R: Future for Australian Tertiary Education: Developing an Integrated, Coherent Policy Vision, in Visions for Australian Tertiary Education, Melbourne CSHE, February 2017.*

*Future-Proof: Protecting Australians through education and skills, Business Council of Australia, October 2017.*

*Gallagher S. Future of tertiary education: across a spectrum of learning, The Australian, March 14, 2018.*

*Gallagher S., Innovative Credentials: Turning a drop in a bucket into a transformative tidal wave, The Evollution, September 2016.*

*Goedegebuure L, Massaro V, Meek L and Pettigrew A: A Framework for Differentiation, in Visions for Australian Tertiary Education, Melbourne CSHE, February 2017.*

*Griew, R.; Three Lessons from a decade of higher education policy stalemate, The Nous Group, 2018.*

*Griffin T; Disadvantaged learners and VET to higher education transitions, NCVET, 2014.*

*Higher Education in Australia: A review of reviews from Dawkins to today, Commonwealth of Australia, 2015.*

## REFERENCES

- King C., *Towards a tertiary future*, IRU Discussion Paper, November 2018.
- Kis V.: *Work, train, win: work-based learning design and management for productivity gains*, OECD Working Paper 135, May 2016.
- Milligan S. and Kennedy G.; *To what degree? Alternative micro-credentialing in a digital age*, in *Visions for Australian Tertiary Education*, Melbourne CSHE, February 2017.
- NCVER Submission to Business Council, 19 January 2018.
- Noonan P., *A new system for financing Australian tertiary education*, Mitchell Institute, September 2016.
- Noonan P., *Building a sustainable funding model for higher education in Australia*, Mitchell Institute, January 2015.
- Noonan P and Pilcher S., *Participation in tertiary education in Australia*, Mitchell Institute, April 2018.
- Norton A., *Mapping Australian higher education 2016*, Grattan Institute.
- Norton A., *To fix higher education we also need to fix vocational education*, *The Conversation*, September 5, 2018.
- Norton A. and Cherastidtham I., *Mapping Australian higher education 2018*, Grattan Institute, 2018.
- OECD, *At a glance*, 2017.
- PhillipsKPA; *Engaging Employers in Work Integrated Learning; Current State and Future Possibilities*, September 2014.
- PhillipsKPA, *Contextual Research for the Australian Qualifications Framework Review*, April 2018.
- Pilcher S and Torii K., *Expenditure on education and training in Australia 2017*, Mitchell Institute, December 2017.
- Review of Australian Higher Education, Final Report*, December 2008.
- Sachs J and Rowe A.; *2016 Good Practice Report - Work Integrated Learning*, Australian Government Department of Education and Training, September 2016.
- Sharrock G., *Six things Labor's review of tertiary education should consider*, *The Conversation*, May 25, 2018.
- Shifting the Dial: 5 year productivity review*, *The Productivity Commission*, 2017.
- Submission in Response to "Future Proof"*, *Universities Australia*, January 2018.
- The Skilled Labour Market 2016 - 17* at [www.employment.gov.au/skill-shortages](http://www.employment.gov.au/skill-shortages)
- Total VET students and courses 2017*, NCVER, Commonwealth of Australia, 2018.
- Universities Australia, Data Snapshot*, 2018.
- Usher, A.; *What makes Canada unique in post-secondary education? Higher Education Strategy Associates*, 27 April 2018.
- Watson L., Hagel P. and Chesters J; *A half-open door: pathways for VET award holders into Australian universities*, NCVER, 2013.
- Wheelahan, L, 'What kind of access does VET provide to higher education for low SES students? Not a lot', *University of South Australia, Adelaide*, 2009.

## Websites

<https://theconversation.com/fact-check-what-do-students-contribute-to-their-own-degrees-27280>

[https://cdn.aigroup.com.au/Reports/2018/Industry\\_4\\_Higher\\_Apprenticeship\\_Program\\_July\\_2018.pdf](https://cdn.aigroup.com.au/Reports/2018/Industry_4_Higher_Apprenticeship_Program_July_2018.pdf)

<https://www.education.gov.au/vet-student-loans>

<http://cdn1.acen.edu.au/wp-content/uploads/2015/03/National-WIL-Strategy-in-university-education-032015.pdf>

[www.nzqa.govt.nz/about-us/consultations-and-reviews/recognising-micro-credentials-in-New-Zealand](http://www.nzqa.govt.nz/about-us/consultations-and-reviews/recognising-micro-credentials-in-New-Zealand)

<https://www.education.gov.au/skilling-australians-fund>.

## Workforce Development Services



Recruitment  
Services



Graduate Employment  
Services



Apprentice and  
Trainee Centre



Accredited Training



Short Courses

## Other Ai Group Services



Membership



Legal



Policy  
Development



Consulting



# FUTURE SKILLS

To adapt to the future of work, Australians will undertake a third more education and training and change what, when and how we learn.

Prepared by AlphaBeta  
for Google Australia

**αlphaβeta**  
strategy x economics

## Important Notice on Contents – Estimations and Reporting

This paper was commissioned by Google and prepared by AlphaBeta. All information in this report is derived from AlphaBeta analysis using both proprietary research and publicly available data. Where information has been obtained from third-party sources, this is clearly referenced in the footnotes.

# αlphaβeta

strategy x economics

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

### **Sydney**

Tel: +61 2 9221 5612

[Sydney@alphabeta.com](mailto:Sydney@alphabeta.com)

### **Singapore**

Tel: +65 6443 6480

[Singapore@alphabeta.com](mailto:Singapore@alphabeta.com)

### **Canberra**

[Canberra@alphabeta.com](mailto:Canberra@alphabeta.com)

### **Melbourne**

[Melbourne@alphabeta.com](mailto:Melbourne@alphabeta.com)

# CONTENTS

	EXECUTIVE SUMMARY	6
1	Australia needs a surge of investment in skills to prepare for the future of work	10
	<i>The average Australian will increase learning by a third over their lifetime</i>	11
	<i>Australians will need to 'reskill' as they change jobs 2.4 times by 2040</i>	12
	<i>Workers will need to 'upskill' as their job tasks change by 18% every decade</i>	13
	<i>Future workers will spend more time learning than any previous generation</i>	14
	<i>The total national stock of education and training will rise substantially</i>	15
2	WHAT WE LEARN: Australians need to focus on the skill sets that machines can't replicate	16
	<i>The most valuable skills will be distinctively human characteristics</i>	17
	<i>There is no 'one-size-fits-all' future skill set</i>	24
3	WHEN WE LEARN: Australians need to dramatically increase learning later in life	30
	<i>Australians will shift towards lifelong learning</i>	31
	<i>Australians will need three times as much mid-career learning</i>	32
4	HOW WE LEARN: More learning will be delivered flexibly and at work	36
	<i>Much of the new learning will be work-based</i>	37
	<i>Learning will need to flexibly cater for mid-career workers</i>	39
5	IMPLICATIONS	42
	<i>Australia needs to invest dramatically more in skills</i>	43
	<i>Education providers need to adjust teaching methods and content</i>	45
	<i>Governments and businesses need to support the shift to lifelong learning</i>	46
	<i>Teaching new skills needs to be a whole-of-country effort</i>	47
6	TECHNICAL APPENDIX	48



# The future of work in Australia...



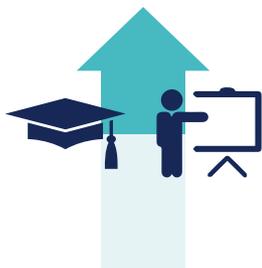
Australians will need **new skills** to adjust to the future of work. **By 2040** the average Australian will spend an additional

 **3 hours** per week

in education and training –

a **33%** increase

across their lifetime.



The most valuable skills will be those that **complement, rather than compete** with automation and artificial intelligence.

The fastest growing skills are the **uniquely human traits** that machines cannot easily replicate such as:

**adaptability**



**creativity**



**team work**



**integrity**



Much of this additional learning will occur later in life as workers:



**Reskill**

in response to job changes



**Upskill**

in response to changes in the tasks within their jobs

Australians will need to **double the share of learning they do after the age of 21** from



For most people the extra learning won't be all about more years at university or TAFE.

Most of the extra learning will occur at work through

**on-the job training**



**& short flexible courses**



aimed at mid-career workers.

# EXECUTIVE SUMMARY

By 2040, the way we work and learn will look vastly different from today. Advances in technologies like robotics and artificial intelligence are automating a growing number of tasks previously performed manually by human workers. Automation is sweeping through customer service, from supermarket checkouts to personal banking. Robots are mastering ever more complex tasks on factory floors. Satellites and drones are helping farmers grow their crops.

While Australians know the way they work is changing, they are less clear on the skills they need to adapt to new kinds of automation. Does every Australian need to be proficient in a coding language? What will older workers need to know to remain employable? Is it more important for early career workers to develop a technical specialisation or to develop enterprise skills such as communication and leadership?

This report helps Australians navigate the major shifts in the future of work by answering three critical questions:

- **What** skills do we need to succeed in the future?
- **When** during our working lives will we need to learn these skills?
- **How** can we adjust work and learning practices to acquire the skills we need?

To understand how skill requirements for the Australian workforce are shifting, the report analyses recent changes in more than 300 jobs, more than 2,000 work tasks and more than 500 skills required to complete these tasks. We examine how tasks are changing in our economy, and the skills workers are using more often in response.

More importantly, this report translates what we know about the jobs of the future into what it means for the skills of the future. It assesses in detail how much time, in hours, every worker in this country has spent on education and training over their lifetime – and how much these investments in skills will likely need to change by 2040.

This approach offers unique insights into the amount of training and education required for each Australian occupation today and in the future. The result is a comprehensive picture of the actual size of the reskilling challenge in this country.

## Australians will spend 33% more time on education and training across their lifetime by 2040

By 2040, Australians will need to invest significantly more time in education and training, as skills become a worker's greatest asset in more complex, machine-assisted workplaces. Growing demand for skills will be driven by three groups of workers: people requiring additional training as they switch jobs or careers ('reskilling'), people requiring additional training as their job tasks change ('upskilling'), and future workers – those who haven't yet joined the labour force and are expected to spend more time in education and training than any generation before them.

- **Reskilling demand:** the average Australian worker will likely change jobs 2.4 times over the next two decades. By 2040, 9 out of 10 Australians between 21 to 65 years are expected to have changed occupations at least once. Most of these people will require some reskilling to successfully switch from one job to the next.
- **Upskilling demand:** Workers who stay in their roles will need to frequently refresh their skills to navigate changes in the way they do their jobs. Automation and globalisation are causing tasks across all Australian occupations to change by an average of 18 per cent every decade.<sup>1</sup>
- **Future worker skills demand:** Some of the strongest demand for additional education and training will come from younger people, who will need to be much better prepared than their parents to keep up with a highly dynamic work environment. Compared with today's workers, Australia's future generation of workers will need to spend an additional 3 hours per week on education and training until retirement.

The scale of the reskilling revolution that needs to occur because of these three trends is immense. An additional 3 hours per week of education and training for future workers might not sound like a huge effort, but across a lifetime it means an additional 8,000 hours of training – 33 per cent more than what workers undertake today.

In addition to this increase, Australians will need to change what, when and how they learn.

Today the average working-aged Australian completes a total of 24,000 hours of education and training, which includes all their time spent in school, post-secondary, formal training and on-the-job learning. Across the whole Australian population this equals a total stock of education and training of 300 billion hours.

Demand for reskilling, upskilling and the new skills for new workers will double the total stock of education and training required to **600 billion hours by 2040**.

<sup>1</sup> This finding is in line with past research showing that, for the average Australian worker, machines have already taken on two hours per week of repetitive and routine tasks since the start of the millennium, and they are set to replace another two hours per week by 2030. AlphaBeta (2017), *The Automation Advantage. How Australia can seize a \$2 trillion opportunity from automation and create millions of safer, more meaningful and more valuable jobs*. Available at: <http://www.alphabeta.com/wp-content/uploads/2017/08/The-Automation-Advantage.pdf>.

## WHAT WE LEARN: Australians need to acquire skills that complement, rather than compete with, automation

What skills will workers need to succeed in the jobs of the future? This report analyses more than 500 skills and maps them to tasks to identify which skills are required to support future human work. We categorise those skills into three groups:

- **Knowledge** refers to the body of information that can be directly applied to the performance of a task, such as medicine, maths, language, architecture, and accounting.
- **Abilities** refer to an observable physical or mental competence, such as strength, design, listening, driving, time management or programming.
- **Characteristics** relate to the way we execute tasks, and include creativity, integrity, leadership, persistence, empathy, and attention to detail.

The data shows that the fastest-growing skills are 'characteristics'. This is not surprising because these are the hardest skills for machines to replicate. As more knowledge and abilities become codified they can be mastered by machines, leaving workers to focus on more uniquely human skills.

However, humans will always require a broad education because it takes a range of skills to complete a job task. While 'characteristics' like leadership, empathy and creativity will become increasingly important, they are only valuable when combined with general skills.<sup>2</sup> It takes more than just one type of skill to complete a job task. This means humans will continue to use a broad mix of skills in the future, even if some of these skills can be mastered by a machine.

## WHEN WE LEARN: Australians will do much more learning later in life, doubling the share of education and training that occurs after the age of 21

Today, more than 80 per cent of the time we spend in education and training occurs before the age of 21. But the idea that a post-secondary qualification will set us up for life is no longer a reality. In the future, workers will not be able to rely solely on what they learned as a teenager. To remain employable, workers will need to make a habit of refreshing existing skills and adding new ones throughout their career.

Three trends are driving the shift towards lifelong learning: longevity, automation and less predictable career paths. Our analysis shows that Australians will need to more than double the time they spend on learning after the age of 21 compared to today. This will lead an average worker's share of training after the age of 21 to increase from 19 per cent today to 41 per cent in 2040.

## HOW WE LEARN: Rather than accumulating more qualifications, most of the new learning will be targeted, flexible, work-based training

As Australians learn more later in life, we will need to change how we learn. For many people seeking to update their skills during their career, the traditional models of university and TAFE qualifications are neither necessary nor compatible with their work and family lives.

Rather than accumulate additional degrees, workers will learn through short courses and on-the-job training which focusses directly on the specific skills

<sup>2</sup> See Appendix for a detailed list of skills analysed in this report.

they require. To navigate rapid job and task changes in the future, Australians will need to seek more opportunities to improve their skills while at work. Our analysis suggests formal workplace training and informal on-the-job learning together would need to make up nearly 42 per cent of an average Australian's total lifetime skills training by 2040, twice as much as today (21 per cent).

More people will be working and studying at the same time. Some will seek to free up time during work hours to acquire new skills, while others will try to fulfil their growing learning needs outside of their work routine by taking evening, weekend or online courses. Education will need to become a lifelong journey that extends beyond formal institutional learning.

## Lessons from the skills shift

Millions of individuals will need to learn new skills over the next two decades, including through reskilling and upskilling, to be ready for more frequent changes in jobs and the tasks within jobs. This skill shift will put the education and training system into the spotlight. Australians will only be able to satisfy the additional skills requirement if education and training providers keep up with the expected surge in demand.

In the future, there will be a growing need for flexible, bite-sized courses that allow workers young and old to quickly acquire the exact additional skills they need at a certain point in their careers. Demand for online courses will likely increase. Australia's education and training providers will need to adjust their teaching models to the era of 'fit-for-purpose' learning.<sup>3</sup>

Dealing well with skills shifts will require significant national reform. The challenge is substantial, and business as usual is not an option. Governments need to ensure funding and accreditation systems provide the right incentives for the necessary shift towards learning flexibly and later in life. Businesses

will need to prioritise formal training for their workforce, and make more mentoring and on-the-job learning opportunities available.

For Australia to succeed, governments and community leaders will need to drive community skills awareness and enable public participation in human-skills education. Many of these uniquely human skills are developed outside of the formal education environment, which means broader society will need to be mobilised. Parents and other family members, community organisations, sports clubs and social media role models should understand and embrace their roles in teaching children skills that make us uniquely human: empathy, ingenuity, cooperation, resilience, ethics and integrity. Having these skills will allow future Australians to succeed in a world where human work will continue to be as indispensable as the machines that enable our society to function.

<sup>3</sup> The Australian Productivity Commission, in a recent report, listed several barriers to upskilling and retraining that Australia would need to overcome. It recommended governments provide easier access to information, create improved VET pathways for upskilling, establishing 'lifelong learning accounts' and creating an independent assessment system to stimulate upskilling and retraining. See: Australian Government Productivity Commission (2017), *5-year productivity review. Supporting paper no. 8: upskilling and retraining*. Available at: <https://www.pc.gov.au/inquiries/completed/productivity-review/report/productivity-review-supporting8.pdf>

1

AUSTRALIA NEEDS  
A SURGE OF  
INVESTMENT IN  
SKILLS TO PREPARE  
FOR THE FUTURE  
OF WORK



Automation is only one of the powerful trends making the future of work less predictable. Most Australians will in future change jobs multiple times over the course of their careers. Even people who don't switch employers will have to cope with change in the mix of tasks that their jobs involve. To navigate these shifts, Australians will need to make learning new skills a lifelong habit.

### **An average Australian will increase learning by a third over their lifetime**

Over the next two decades, Australians will need to invest in new skills if they are to succeed in the future of work. Australian jobs are being reshaped by automation, globalisation and demographic change. Factory labourers are now working alongside robots just as office and field workers have begun to rely on data analysis and smarter software to complete jobs faster and more efficiently. Outsourcing and digital platforms have created a truly global workforce in many industries. And people are living longer and demanding more flexible working arrangements.

The scale of workforce change in Australia was described in AlphaBeta's *Automation Advantage* report, commissioned by Google in 2017. The report showed that Australian jobs are changing at a rapid rate with machines taking on more tasks that were once done by humans. In particular, machines are taking on tasks that are routine, administrative and physical and leaving humans to focus more on tasks that are interpersonal, cognitive and creative.

As Australians change our jobs, and the tasks within our jobs, we will need to update our skills accordingly. The future of work will increase demand for three types of learning:

- **Reskilling:** More people will require additional training, as job and career switches become more common than in the past.
- **Upskilling:** Every worker's requirement for learning new skills at work will increase, as job tasks continuously change.
- **Future workers:** Young Australians who haven't yet joined the labour force will likely spend more time learning than any generation before them, as they need to keep up with an increasingly complex and demanding work environment.

## Australians will need to ‘reskill’ as they change jobs 2.4 times by 2040

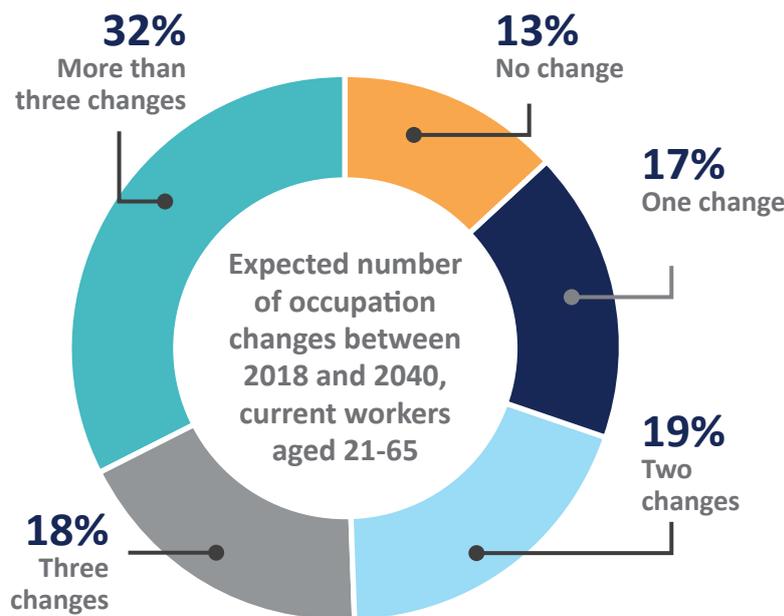
Every year, 2.1 million Australians, or 18 per cent of the country’s workforce, switch jobs.<sup>4</sup> This report uses a simulation, based on data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, to estimate how frequently Australian workers will likely change jobs in the future.<sup>5</sup> The result suggests that the Australian labour market will remain highly dynamic, as most Australians are expected to

change jobs multiple times throughout their careers. By 2040, 87 per cent of all Australian workers between 21 and 65 will have changed occupations at least once (see Exhibit 1). On average, every Australian will change occupations 2.4 times over the next two decades.

When workers change jobs, they need to learn new tasks. An average job change in Australia involves a worker changing more than one fifth of the tasks they complete (22 per cent). To master these new tasks, workers usually need new skills, which creates demand for education and training.

## EXHIBIT 1

By 2040, most Australians will have changed jobs multiple times



- 87% of workers will have changed their job at least once by 2040
- The average Australian will have changed occupations **2.4 times** by 2040
- Around **88%** of people under 50 and **33%** of people over 50 will have changed occupations more than once
- With every job change, a workers tasks change on average by **22%**, which may create a need for **reskilling**

<sup>4</sup> AlphaBeta (2018), unpublished research.

<sup>5</sup> See Appendix for further details on methodology

# Workers will need to ‘upskill’ as their job tasks change by 18% every decade

Even workers who stay in their existing jobs need to adapt and learn new skills to keep up with changes in technology and business processes. For this report, we analysed the change in ‘tasks’ within each Australian job by dividing each occupation into up to 2,000 tasks using data from the US jobs database O\*NET.<sup>6</sup> This analysis reveals that across all 348 occupations in the Australian economy, the

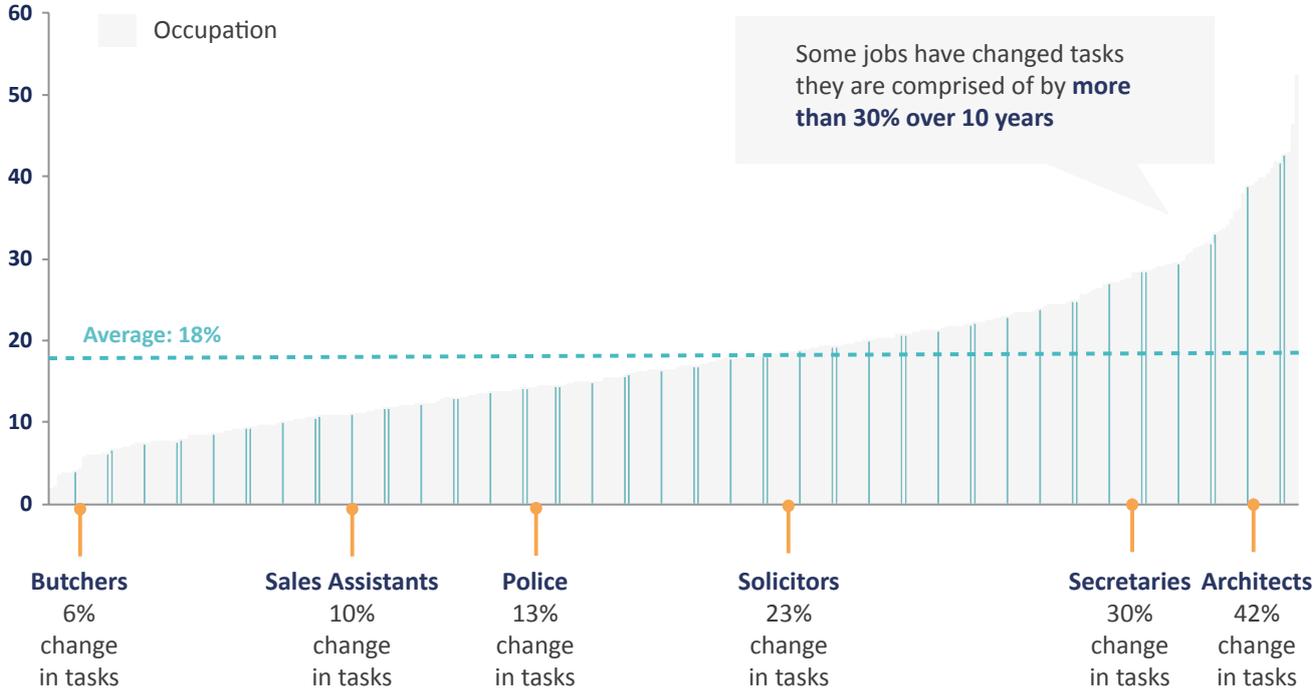
average change in tasks in a ten year period was 18 per cent (Exhibit 2), which means that nearly a fifth of all tasks in a job are redundant and replaced with new tasks each decade.

Of course the level of task change varies substantially around this average. For example, a butcher’s tasks have changed only 6 per cent since 2006, while an architect’s work routine has changed more dramatically, by 42 per cent, over the same period. Computer software now helps architects create drawings faster than in the past, which frees them up to spend more time with clients or on design.

## EXHIBIT 2

### Tasks in Australian jobs change on average by 18% every decade

Total change in tasks for each Australian occupation in %, 2006-2016



Note: Task change was measured by taking the absolute value of the per cent change in time spent on over 2,000 activities across occupations (to capture both positive and negative task change) and then halving this value to arrive at a proxy for average task change.  
 Source: O\*NET, AlphaBeta analysis

<sup>6</sup> See Appendix for detailed methodology

## Future workers will spend more time learning than any previous generation

Another factor which is increasing the demand for skills is the increase in investment in education and training among young people. Young Australians are spending more time learning over the course of their working lives than any other generation before them and this is forecast to increase.

Part of this increase will come from rising school completion rates and rising enrolment in post-secondary education. Already, record numbers of Australians are pursuing higher education today.<sup>7</sup> In 2016, 56 per cent of Australians aged 15 years and

over had attained a post-school qualification, up from 46 per cent a decade earlier.

However, the future increase in education and training doesn't mean that all workers will need to spend more time accumulating university and vocational qualifications. Much of the increase in learning will occur in the workplace – a young Australian in 2040 will spend three times as much time learning on the job throughout their working lives compared with a young worker today (see Exhibit 3).

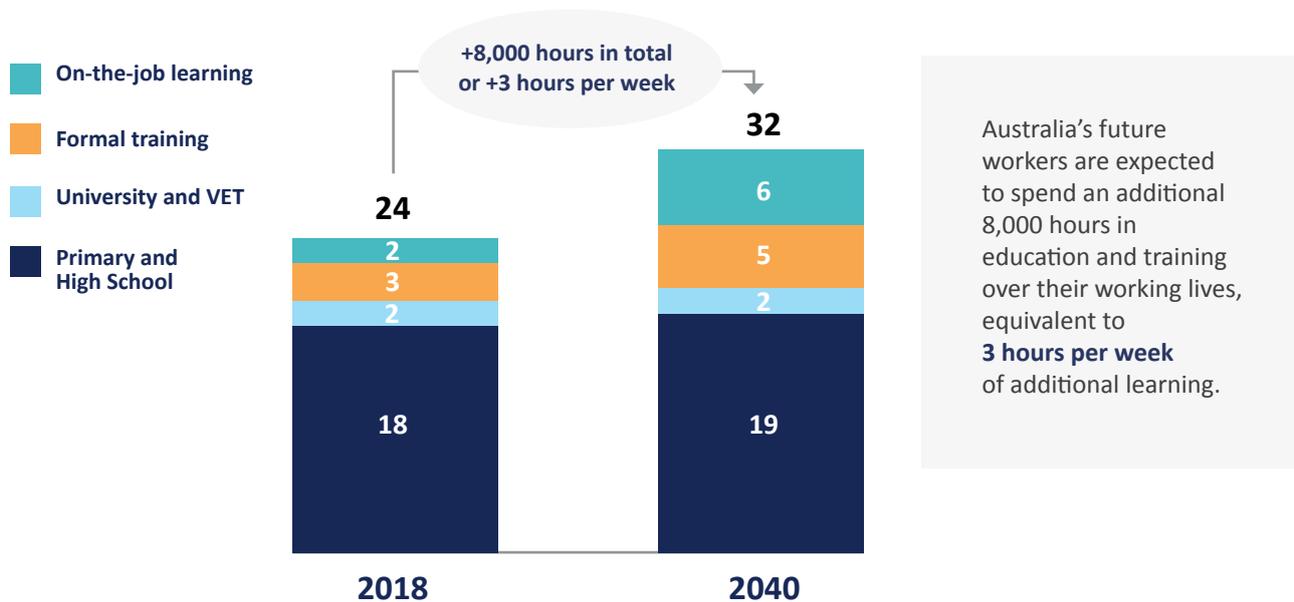
Overall, the average future worker will need to spend an extra 8,000 hours learning over a lifetime, which is equivalent to 3 additional hours of learning per week.

## EXHIBIT 3

### Australia's future workers will need to spend 3 additional hours per week learning new skills compared to today's workers

#### Time future workers\* are required to spend learning over their working lives

Education and training per person, '000 hours



\*Future workers are defined as people joining the workforce after 2018. Note: Figures for 2040 exclude retraining of current workers. Source: O\*NET, ABS, HILDA, AlphaBeta analysis

<sup>7</sup> Australian Bureau of Statistics (2017), "Australians pursuing higher education in record numbers". Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mediareleasesbytitle/1533FE5A8541D66CCA2581BF00362D1D?OpenDocument>.

## The total national stock of education and training will rise substantially

An additional 3 hours per week learning might not sound like a huge effort, but across a lifetime it means an additional 8,000 hours of training or an increase of about a third for each worker.

What does this increase mean for the economy as a whole? Today, an average working-aged Australian completes a total of 24,000 hours of education and training, which includes all the time spent in school, post-secondary, formal training and on-the-job learning (see Exhibit 4). Across the whole Australian population this equals a total stock of education and training of 300 billion hours.

New demand for reskilling, upskilling and the new skills for new workers will double the total stock of education and training required to **600 billion hours by 2040** (see Exhibit 4). About 50 billion of these

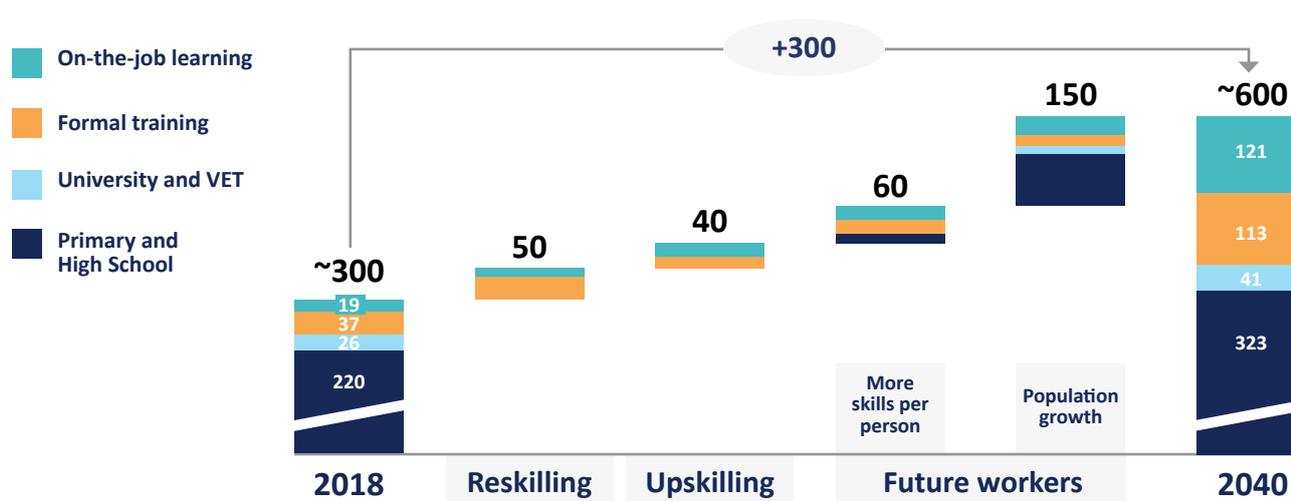
hours will be required to reskill workers moving jobs. Most of this training will likely be delivered through short formal courses and on-the-job training. About 40 billion hours will be required to upskill workers who have to learn new tasks as part of their existing job, of which almost all will be delivered as on-the-job training.

A further 60 billion hours will be required to account for the general increase in education and training levels: workers entering the labour market tend to have more education and training than older workers leaving the labour market. And population growth, including growth in the domestic population and net migration, will increase the total demand for skills by 150 billion hours.<sup>8</sup> However, skilled migration is expected to significantly alleviate this burden on the education and training system. Over one third of the additional hours driven by population growth (54 billion hours) will be imported via skilled migrants.

## EXHIBIT 4

### Australia's workforce will need to double the total time spent on learning new skills to 600 billion hours in 2040

Required change in training 2018 to 2040 Total stock for labour force, in billions of hours



Source: O\*NET, ABS, HILDA, AlphaBeta analysis

<sup>8</sup> Australia's workforce participation rate for people aged 15 to 64 is projected to increase from 76.2% in the fiscal year 2015 to 79.1% in the fiscal year 2045, according to the latest Intergenerational Report. See: Australian Government (2015), *Intergenerational Report*. Australia in 2055. Available at: <https://treasury.gov.au/publication/2015-intergenerational-report/>.

**WHAT WE LEARN:  
AUSTRALIANS NEED  
TO FOCUS ON THE  
'SKILL SETS' THAT  
MACHINES CAN'T  
REPLICATE**

As more manual and routine tasks are taken on by machines, humans will need new skills for the tasks that will comprise the jobs of the future. In the future, the most valuable skills will be uniquely human characteristics, but these will need to be supported by a broad foundation of skills that together constitute the skill set required to perform a specific task.

### The most valuable skills will be distinctively human characteristics

Technological progress means that machines are increasingly capable of replicating even sophisticated human skills. Speech-recognition systems are now able to distinguish between hundreds of different human languages, accents and commands. Advances in deep neural networks and other machine learning techniques have led services firms, from banks to travel agents, to use chatbots for initial customer contact before forwarding queries to a human. Technology companies are continuously improving natural language recognition and improving the word error rate of machines when making sense of human communication.<sup>9</sup>

As machines become a more important part of the workplace, how will humans need to change their skills to remain relevant? To answer this question, we begin by grouping skills into three categories.

- **Knowledge** refers to the body of information that can be directly applied to the performance of a task, such as medicine, maths, language, architecture, and accounting.
- **Abilities** refer to an observable physical or mental competence, such as strength, design, listening, driving, time management or programming.
- **Characteristics** refer to character attributes or attitudes that include integrity, leadership, persistence, empathy, and attention to detail, which also form an important part of the skill set needed to perform a task.

<sup>9</sup> IBM (2017), "Reaching new records in speech recognition". Available at: <https://www.ibm.com/blogs/watson/2017/03/reaching-new-records-in-speech-recognition/>.



## 2: WHAT WE LEARN

---

Machines are mastering some of these skills faster than others. Human ‘knowledge’ is easier to codify than ‘abilities’ or ‘characteristics’ and therefore more susceptible to automation (see Exhibit 7). Knowledge is easier to codify because its underlying rules can be written down and explained to a machine. It’s easier to train a machine to understand mathematical rules (knowledge) than it is to teach it to drive (an ability) or be creative (a characteristic). In particular, complex and context-dependent human characteristics like empathy or leadership are challenging to translate into a language that a machine can understand. This means that any skill set comprising even a small share of tacit capability will remain the domain of humans because tacit skills cannot be codified.

Automation has so far been most successful in areas where a task can be converted into explicit instructions that a computer understands. Think of robotic arms in a car factory. Their movements

follow a clear pattern. Robots can identify a car part, lift or lower it into place, and secure it to the chassis. The arm then performs the exact same action to secure an identical part to the following chassis. Such repetitive, routine tasks, and the skills needed to perform them, can be monitored, codified as data, and therefore made open to automation.

However, tasks that require tacit capabilities – ideas and wisdom that are highly subjective, context-specific, and related to intuition and personal experience – are much more difficult to codify for machines.<sup>10</sup> For example, a surgeon can use a robotic arm to perform minimally invasive surgery. But even the most intelligent machine is yet unable to fully replace a surgeon for tasks that rely on uniquely human characteristics to interact with patients, including intuition, empathy, and judgment (see Box 2 – Case study: using uniquely human skills at work).

<sup>10</sup> For background on the concept of ‘tacit knowledge’, see for example: Adler, Paul (2013), The dynamic relationship between tacit and codified knowledge: comments on Ikujiro Nonaka’s “Managing innovation as an organisational knowledge creation process”. Available at: <http://www-bcf.usc.edu/~padler/research/Tacit%20to%20explicit%20draft-1.pdf>.

## BOX 1

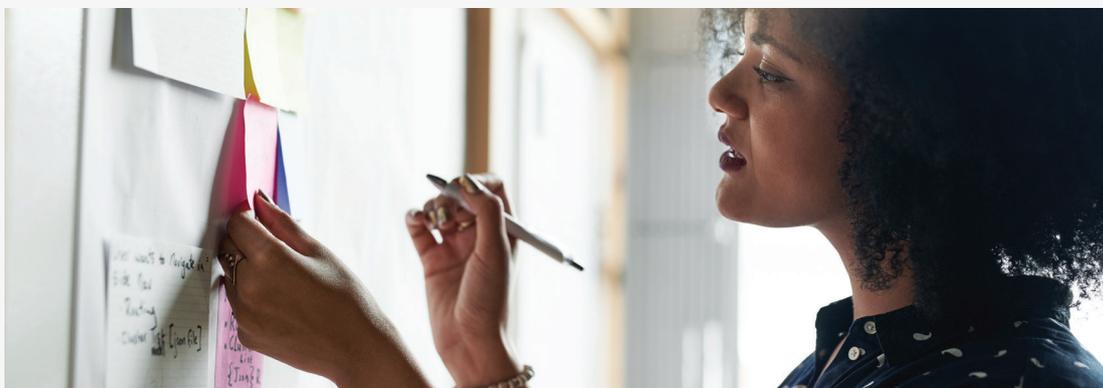
### Methodology: From skills to skill sets

In this report we define ‘skills’ as a set of three different types of capabilities: knowledge, abilities and characteristics. Knowledge, in this context, refers to the body of information that can be directly applied to the performance of a task, such as medicine, maths, language, architecture, and accounting. Abilities refer to an observable physical or mental competence, such as strength, design, listening, driving, time management or programming. Lastly, personal characteristics, character attributes or attitudes – including integrity, leadership, persistence, empathy, and attention to detail – also form an important part of the skill set needed to perform a task. A full list of skills analysed in this report can be found in the Appendix.

Humans never use their skills in isolation. In practice they use a complex interplay of knowledge, abilities and personal characteristics to get work tasks done. For example, the task of creative writing requires a worker to use varying degrees of knowledge (English language), abilities (writing) and specific human characteristics (empathy). Writers can’t do their work by

using just one of these skills, they use all of them together. This report proposes a more nuanced approach to solve the skills conundrum. It recognises that it always takes a combination of knowledge, abilities and characteristics to perform a work task. These skill combinations are summed up under the umbrella term ‘skill set’ in this report. Exhibit 5 gives some examples for skill sets.

Automation only affects a job when a machine can replicate the entire ‘skill set’ – the full combination of knowledge, abilities and characteristics – required to perform a human task. Take ‘vital monitoring’, a critical task in the nursing profession. This task can only be automated when a machine is fully capable of replicating the entire range of capabilities nurses need to complete this task: their knowledge of mathematics and biology, their ability to gain insights quickly just from what they perceive with their senses, their communication skills, their ability to respond quickly to patient needs, as well as their very individual human traits of being persistent and paying attention to detail.



# EXHIBIT 5

Humans use ‘skill sets’ – combinations of knowledge, ability and characteristics – to perform a work task

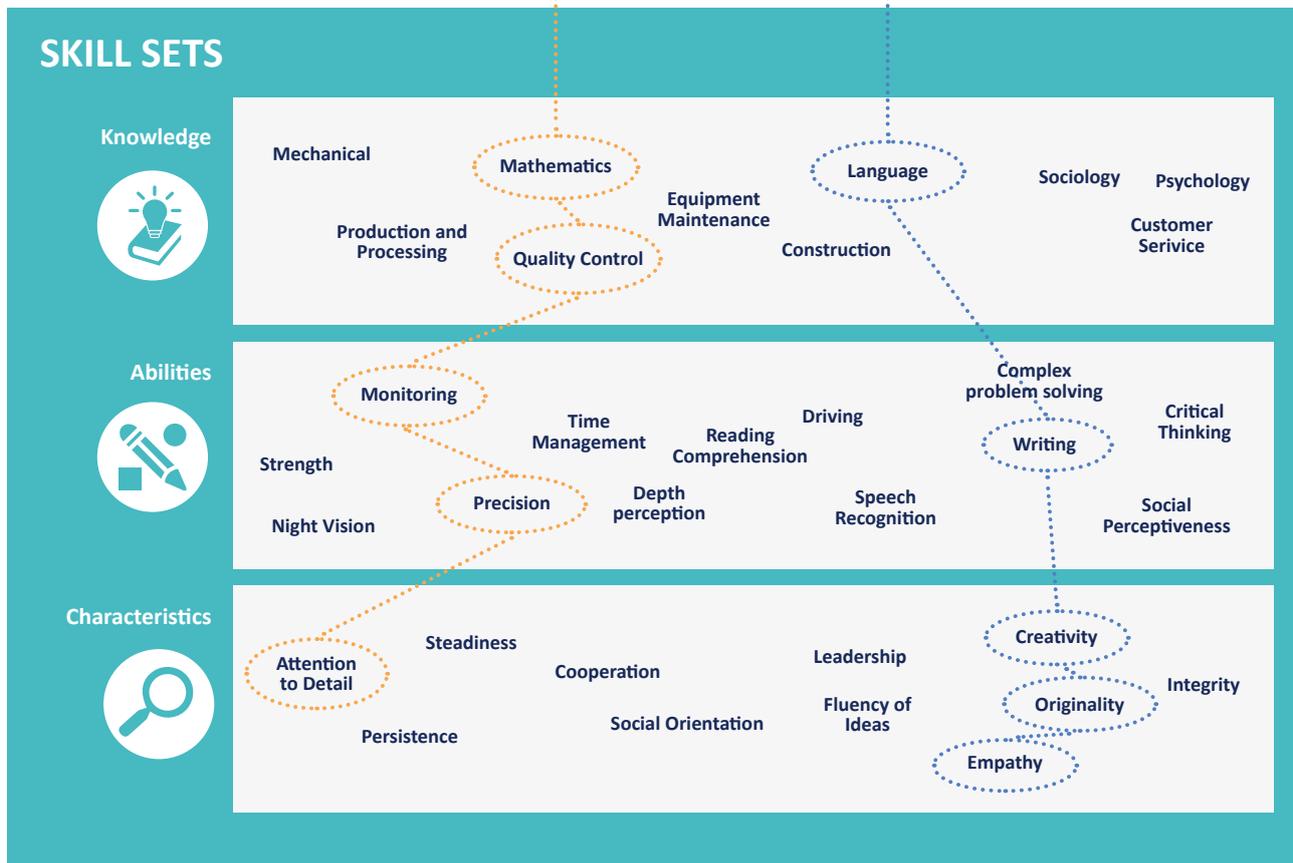
**Jobs** are made up of **tasks** that can be completed with **skill sets**, which are combinations of knowledge, abilities and characteristics.

**EXAMPLE 1:**

The **skill set** required to perform **operations monitoring** tasks include a combination of **mathematics, quality control, monitoring, precision** and **attention to detail**.

**EXAMPLE 2:**

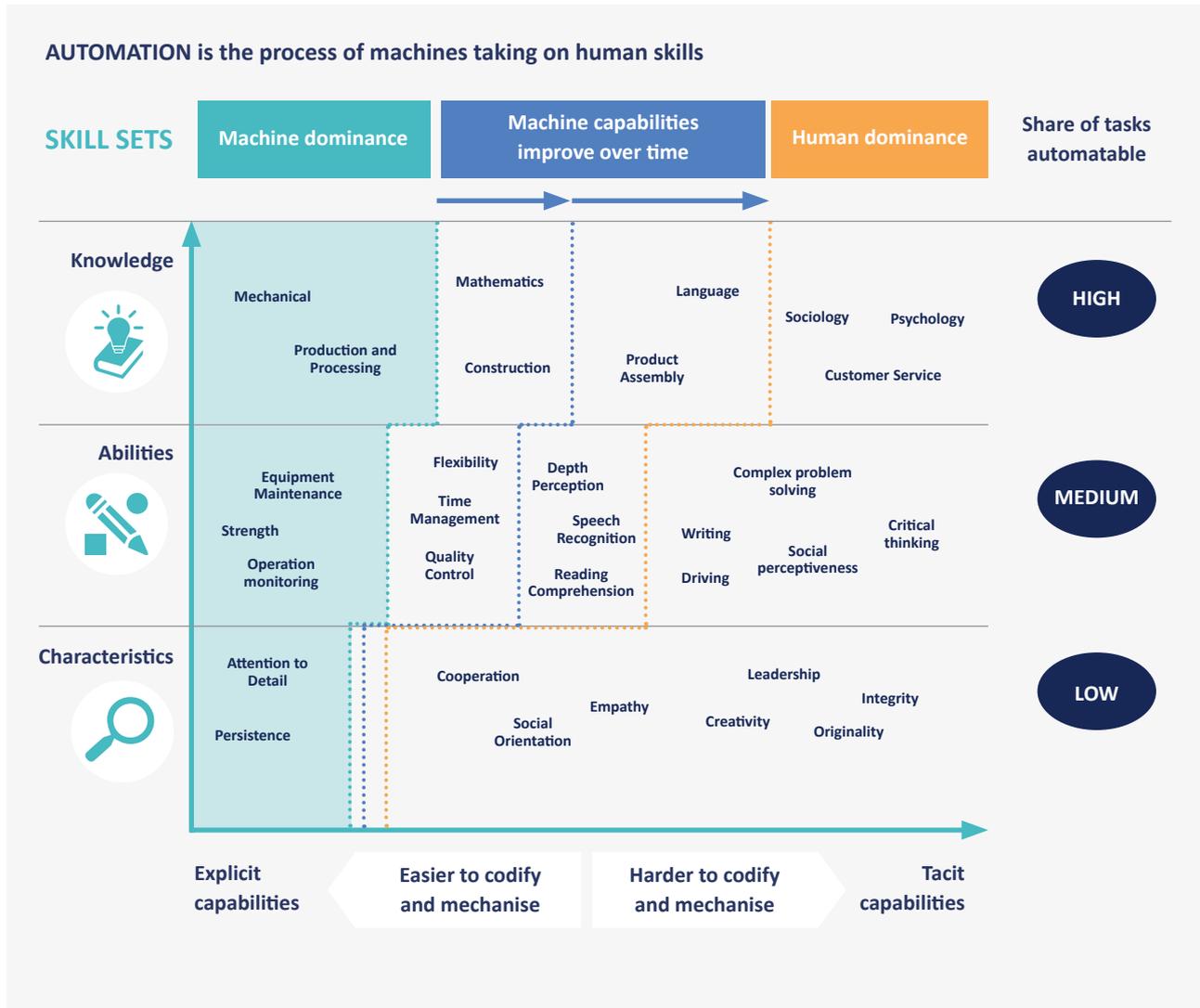
The **skill set** required to perform **creative writing** tasks include a combination of skills including **language, writing, creativity, originality** and **empathy**.



Source: AlphaBeta analysis

# EXHIBIT 6

Machines are good at replicating knowledge and getting better at replicating abilities, however still struggle to replicate human characteristics



Source: AlphaBeta analysis

## 2: WHAT WE LEARN

As machines become more capable, workers will need to shift their learning focus to tasks that are harder to codify and therefore beyond the current ability of machines. In particular, characteristics such as leadership, empathy, creativity, and integrity will become a growing part of the skill sets of humans and set us apart from machines.

But it would be naive to assume that humans will be reduced to using just a few select skills. The reality is that humans never use one skill in isolation. Rather, they use a combination of skills, or

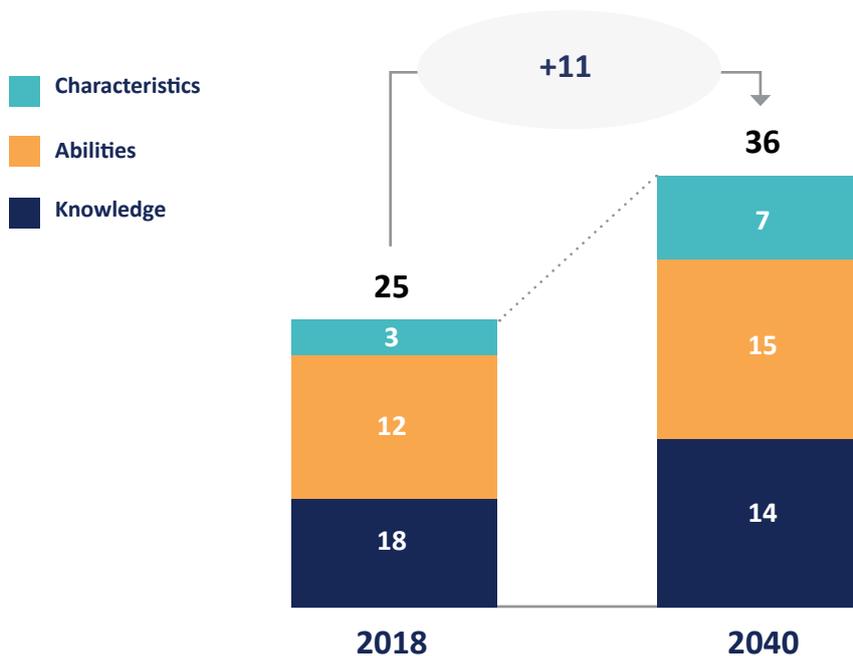
'skill sets', to complete a task. In the future, human workers will increasingly focus on uniquely human skills, but these skills will need to be supported by a broad foundation of skills that together constitute the skill set required to perform a specific task. Exhibit 7 shows the expected increase in different categories of skills by 2040. The relative importance of uniquely human traits in the skill mix will increase and the average Australian worker will need to **spend twice as much time as today on deepening their distinctive human characteristics.**

### EXHIBIT 7

**Characteristics, the uniquely human part of a worker's skill set, will become more than twice as important by 2040**

#### Required shift in learning by skill type

Education and training per person over a working life, in '000 hours



The importance of characteristics will **more than double** over the next two decades as workers shift into tasks that require uniquely human skills such as empathy, leadership, team work & coordination.

Over their lifetime, Australians will need to spend an additional **3.5 hours per week** developing these uniquely human skills.

Source: O\*NET, ABS, HILDA, AlphaBeta analysis

## BOX 2

### Case study: using uniquely human skills at work

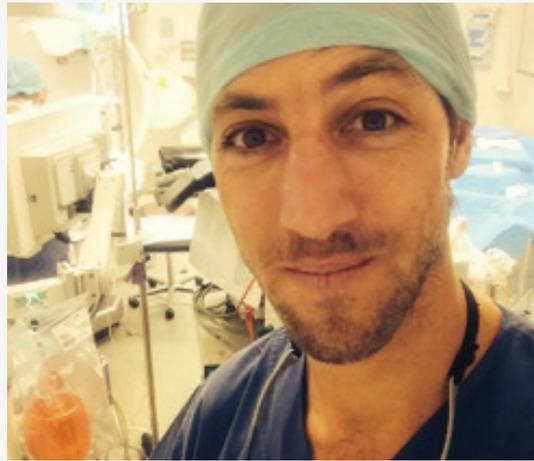
#### **For a surgeon, reassuring patients becomes a major skill as machines take over the operating room.**

In many hospitals, surgeons and nurses are learning to work alongside an army of high-tech helpers – computers, robots and other machines. This does not mean that machines are making medical staff obsolete. Rather, they prompt humans to rely on some skills more than others when treating patients.

Plastic surgeon Tim Peltz, who works as a surgical fellow across five hospitals in Sydney, says his workplace has changed substantially since he started his medical career more than 20 years ago. He and his colleagues today use electric scalpels and digital coagulation devices, ultrasonic suction machines, highly computerised ventilation machines and intelligent computer programs that can help to plan an operation and, in some cases, tell them exactly where to cut.

“Almost every little process in our operating room is now affected by machines,” says Dr Peltz. “There are a lot of cables hanging from the ceiling.”

The fully automated robotic surgery remains a rarity, however. While the global market for surgical robots is booming – analysts at BIS Research expect it to grow by 12 per cent per year to reach more than US\$12.6 billion in 2025 – most procedures are still too complex and unpredictable to be managed entirely by futuristic-looking, four-armed machines like the da Vinci Surgical System. Their most common use is in fields like urology and gynaecology,



Surgeon Tim Peltz at work

where a surgeon’s hands prove too large to make tiny, high-precision cuts in a very tight space.

“You need a very repetitive and consistent surgery situation, otherwise the robot has problems recognising what is what,” says Dr Peltz. His patients typically present with injuries from a workplace accident, and such surgical procedures remain a human domain. They require a surgeon like Dr Peltz to rely on his hands, eyes and intelligence to make the right decisions and moves in the operating theatre.

Dr Peltz says he also needs to be stress-resistant and able to improvise quickly when a machine fails, which he says happens frequently. Above all, he learned to use his empathy and communication skills more often in recent years, as many patients feel unsettled by the technological progress in the operating room. “Medicine is becoming a lot more technical and complicated, so I need to communicate better what I’m doing to have the patient on my side,” says Dr Peltz.

### There is no 'one-size-fits-all' future skill set

As organisations invest in technology that automates tasks within Australian jobs, every Australian will need to learn new skills to effectively integrate these machines into their work. However, there is no blanket formula to predict which specific skills Australia's workforce will need to thrive in a time of increasing investment in artificial intelligence and robotics. Individual skill requirements will continue to vary significantly across occupations, and it is inaccurate to suggest workers will only need to learn programming or improve their complex problem-solving skills to succeed in the future. It is more instructive to examine which occupations rely on skill sets that machines are unable to replicate, because it is these occupations that will be most resilient in terms of their requirement for uniquely human labour.

Many jobs demand workers with a similar mix of skills. When focusing on such similarities in skills, each occupation in Australia can be assigned to one of seven broad occupational clusters (Exhibit 8).

These clusters are:

- **The Generators:** include occupations such as sales representatives, bank managers, entertainers and interpreters, which require a high level of personal interaction.
- **The Artisans:** found in construction, production, maintenance and technical customer service, where workers need to perform many manual tasks. Typical occupations include machinery operators, electricians, plumbers, and farmers.
- **The Designers:** include occupations such as architects, electrical engineers, product testers, geologists and building inspectors, who require good knowledge of science, mathematics, and design for tasks in construction or engineering.
- **The Informers:** need skills to provide information, education and business services. Typical occupations include teachers, economists, accountants, policy analysts, solicitors, journalists, and human resources specialists.
- **The Coordinators:** comprise occupations such as bookkeeper, cook, furniture removalist and receptionist. These professionals typically need to be reliable and have strong time-management skills to perform repetitive administrative tasks, service tasks, and tasks related to behind-the-scenes processes.
- **The Carers:** need to have strong interpersonal communication skills, but also knowledge in biology or psychology, to perform tasks that improve a person's mental or physical health. Key occupations include GP, social worker, childcare worker, fitness instructor, surgeon, and counsellor.
- **The Technologists:** include occupations such as software engineer, database administrator, web designer, and ICT business analyst who need a solid understanding of digital technology to perform their job tasks.



# EXHIBIT 8

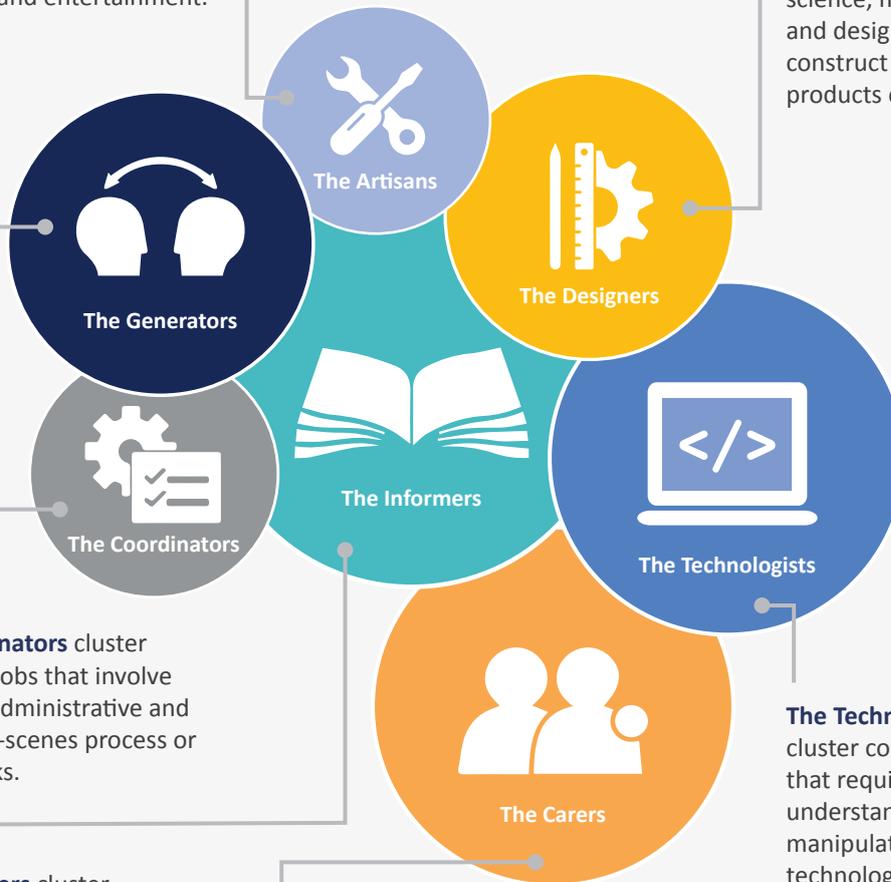
## PART A | The skills of the future vary for different types of work

### Seven clusters of occupations

**The Generators** cluster comprises jobs that require a high level of interpersonal interaction in retail, sales, hospitality and entertainment.

**The Artisans** cluster comprises jobs that require skill in manual tasks related to construction, production, maintenance or technical customer service.

**The Designers** cluster comprises jobs that involve deploying skills and knowledge of science, mathematics and design to construct or engineer products or buildings.



**The Coordinators** cluster comprises jobs that involve repetitive administrative and behind-the-scenes process or service tasks.

**The Informers** cluster comprises jobs that involve professionals providing information, education or business services.

**The Carers** cluster comprises jobs that seek to improve the mental or physical health or well-being of others, including medical care and personal support services.

**The Technologists** cluster comprises jobs that require skilled understanding and manipulation of digital technology.

Source: FYA and AlphaBeta 2017, *The New Work Mindset*. Available at: <https://www.fya.org.au/wp-content/uploads/2016/11/The-New-Work-Mindset.pdf>

## PART B | Main occupations & key skills in each job cluster

	Main Occupations	Key Skills
<b>Generators</b> 	<ul style="list-style-type: none"> <li>▪ Sales reps</li> <li>▪ Bank Managers</li> <li>▪ Entertainers</li> <li>▪ Interpreters</li> </ul>	High level of interpersonal interaction in retail, sales, hospitality and entertainment
<b>Artisans</b> 	<ul style="list-style-type: none"> <li>▪ Machinery operators</li> <li>▪ Electricians</li> <li>▪ Plumbers</li> <li>▪ Farmers</li> </ul>	Manual tasks related to construction, production, maintenance or technical customer service
<b>Carers</b> 	<ul style="list-style-type: none"> <li>▪ GPs</li> <li>▪ Social workers</li> <li>▪ Childcare workers</li> <li>▪ Fitness instructors</li> <li>▪ Surgeons</li> <li>▪ Counsellors</li> </ul>	Seek to improve the mental or physical health or well-being of others
<b>Coordinators</b> 	<ul style="list-style-type: none"> <li>▪ Bookkeepers</li> <li>▪ Fast food workers</li> <li>▪ Cooks</li> <li>▪ Furniture removalists</li> <li>▪ Law clerks</li> <li>▪ Receptionists</li> </ul>	Involve repetitive administrative and behind-the-scenes process or service tasks
<b>Designers</b> 	<ul style="list-style-type: none"> <li>▪ Architects</li> <li>▪ Electrical engineers</li> <li>▪ Product testers</li> <li>▪ Geologists</li> <li>▪ Building inspectors</li> </ul>	Involve deploying skills and knowledge of science, mathematics and design to construct or engineer products or buildings
<b>Informers</b> 	<ul style="list-style-type: none"> <li>▪ Primary and secondary school teachers</li> <li>▪ Economists</li> <li>▪ Accountants</li> <li>▪ Policy analysts</li> <li>▪ Solicitors</li> <li>▪ HR advisers</li> <li>▪ Organisational psychologists</li> </ul>	Involve professionals providing information, education or business services
<b>Technologists</b> 	<ul style="list-style-type: none"> <li>▪ Software engineer</li> <li>▪ Database administrators</li> <li>▪ Web designers</li> <li>▪ ICT business analysts</li> </ul>	Require skilled understanding and manipulation of digital technology



Australians in every occupation have already adjusted their job routine to the rise in automation at work. Rapid changes in the tasks required by Australian jobs have forced workers across all clusters to focus more on skill sets that require a distinctively human contribution. This shift can be measured (see Appendix for details on methodology). Our analysis reveals that the use of uniquely human skills is growing faster than the use of more easily codifiable skills, as work tasks continue to change (Exhibit 9). **Workers are increasingly relying on distinctively human characteristics** such as initiative, persistence or originality to do their jobs. In other words, characteristics are overrepresented among the fastest growing skills across all job clusters, and this trend is expected to continue.

Other than that, there is no clear sign that specific skills are in higher demand than others. Each occupation continues to have its own unique skill requirements. For example, while knowledge about computers and electronics is a fast-growing skill for professionals in the Informers and Technologists cluster, people working as Carers, Artisans or

Designers have needed to shift their focus towards entirely different skills in recent years.

Over the next 22 years, people in the Carers cluster – childcare workers, counsellors or GPs – will have most rapidly shifted to using tasks at work that require stress tolerance, empathy, physical endurance, as well as a basic knowledge of biology. People working as Informers – teachers, accountants or solicitors – will have most rapidly increased their use of active listening, influencing, persistence and integrity.

## EXHIBIT 9

The shift in skills demand depends on each occupation and its tasks, but characteristics are becoming more relevant across all clusters

Fastest growing skills for each job cluster

	Knowledge	Competencies	Characteristics
<b>Generators</b> 	<ul style="list-style-type: none"> <li>Administration and Management</li> </ul>	<ul style="list-style-type: none"> <li>Communication</li> <li>Strategic planning</li> <li>Written comprehension</li> </ul>	<ul style="list-style-type: none"> <li>Persistence</li> <li>Analytical thinking</li> <li>Leadership</li> </ul>
<b>Artisans</b> 	<ul style="list-style-type: none"> <li>Physics</li> <li>Computers and electronics</li> </ul>	<ul style="list-style-type: none"> <li>Judgment and decision making,</li> <li>Reading and oral comprehension</li> </ul>	<ul style="list-style-type: none"> <li>Service orientation</li> <li>Stress tolerance</li> <li>Initiative</li> <li>Analytical thinking</li> <li>Attention to detail</li> </ul>
<b>Carers</b> 	<ul style="list-style-type: none"> <li>Biology</li> <li>Medicine</li> </ul>	<ul style="list-style-type: none"> <li>Systems evaluation</li> <li>Multi-tasking</li> <li>Physical endurance</li> </ul>	<ul style="list-style-type: none"> <li>Stress tolerance</li> <li>Empathy</li> <li>Social orientation</li> <li>Adaptability/flexibility</li> </ul>
<b>Coordinators</b> 	<ul style="list-style-type: none"> <li>Accounting</li> <li>Human Resources</li> </ul>	<ul style="list-style-type: none"> <li>Social perceptiveness</li> <li>Communication</li> </ul>	<ul style="list-style-type: none"> <li>Integrity</li> <li>Dependability</li> <li>Cooperation</li> <li>Social orientation</li> </ul>
<b>Designers</b> 	<ul style="list-style-type: none"> <li>Mechanical</li> <li>Building and Construction</li> </ul>	<ul style="list-style-type: none"> <li>Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>Innovation</li> <li>Attention to detail</li> <li>Initiative</li> <li>Cooperation</li> </ul>
<b>Informers</b> 	<ul style="list-style-type: none"> <li>Computers and electronics</li> </ul>	<ul style="list-style-type: none"> <li>Active listening</li> <li>Influencing</li> <li>Written communication</li> </ul>	<ul style="list-style-type: none"> <li>Service orientation</li> <li>Persistence</li> <li>Integrity</li> </ul>
<b>Technologists</b> 	<ul style="list-style-type: none"> <li>Computers and electronics</li> </ul>	<ul style="list-style-type: none"> <li>Deductive reasoning</li> <li>Programming</li> <li>Computational thinking</li> </ul>	<ul style="list-style-type: none"> <li>Originality,</li> <li>Adaptability,</li> <li>Analytical thinking</li> <li>Innovation</li> </ul>

Source: O\*NET, AlphaBeta analysis

3

**WHEN WE LEARN:  
AUSTRALIANS NEED  
TO DRAMATICALLY  
INCREASE LEARNING  
LATER IN LIFE**

The average Australian today learns more than 80 per cent of their knowledge and skills before the age of 21. However, as we live longer, retire later, change jobs more frequently, and perform more work with the assistance of machines, learning throughout life becomes more important. In the future, Australians will need to continuously revise and refresh personal skills during a variety of life stages and in different personal circumstances, many of which are our current education system is not optimised to serve. The average worker will need to triple the time spent on learning after the age of 21.

## Australians will shift towards lifelong learning

As several major forces reshape the world of work, Australians will need to become more responsive to change within their jobs and in the mix of jobs available. To ensure they remain employable, workers will need to make a habit of refreshing their skills and picking up new ones throughout their careers. Three trends are driving the shift towards lifelong learning: longevity, automation, and more unpredictable career paths.

For one, a **growing number of older workers** in Australia will increase demand for education and training later in life. Rising life expectancy and advances in medical science mean more workers will be healthy enough to work longer. Australians are already working to older ages. Over the decade to 2016, the workforce participation of people aged 65 and over increased from 8 per cent to 13 per cent.<sup>11</sup> This rate will likely increase further as more people choose to retire later in life.

Secondly, the **use of technology to automate tasks** at work will lead a growing number of Australians to constantly learn and adjust their skill sets to work productively with the machines that help them do their jobs. Frequent changes in tasks required to do a job will become the norm as companies continue to use technology to improve their productivity. The trend to use machines, rather than humans, for the most dangerous and backbreaking tasks in Australia's economy is also set to continue and will lead more Australians to shift to safer, physically less strenuous tasks.<sup>12</sup> To master these shifts, workers will need to be prepared to learn new skills throughout their entire working lives.

Thirdly, Australia's highly **dynamic labour market** will contribute to the growing need for lifelong learning. In a typical OECD country more than 20 per cent of jobs are created and destroyed each year as firms adjust their labour demand to periods of industry growth and decline.<sup>13</sup> The rate is similar in Australia, but the number of people changing jobs in our economy has increased slightly from 1.6 million to 2.1 million per year since the early 1990s.<sup>14</sup> This trend is expected to persist as workers and employers continue to respond to the major forces disrupting the economy, including globalisation and urbanisation.

Some workers, especially those in industries affected by offshoring, may need to change jobs involuntarily and even switch careers. However, regardless of whether people change occupations by choice or not, they will likely need some training to perform in a new role. This demand for reskilling will be driven by workers of every age group and strengthen the shift towards lifelong learning.

<sup>11</sup> Australian Government (2017), "Older Australia at a glance". Available at: <https://www.aihw.gov.au/reports/older-people/older-australia-at-a-glance/contents/social-and-economic-engagement/employment-and-economic-participation>.

<sup>12</sup> AlphaBeta (2017), *The Automation Advantage*.

<sup>13</sup> OECD (2016), *Back to work: Australia: improving the re-employment prospects of displaced workers*. Available at: <https://www.oecd.org/employment/emp/Back-to-Work-Australia-AR.pdf>.

<sup>14</sup> AlphaBeta (2018), unpublished analysis.

## Australians will need to triple mid-career learning

Much of what we know, we learn in our youth. On average, Australians today acquire more than 80 per cent of their knowledge, abilities and characteristics before the age of 21. The time a typical Australian adult currently dedicates to learning (2 hours per week) pales in comparison to the time spent on learning as a teenager (26 hours per week).

In the future, lifelong learning will need to dramatically increase if workers want to keep pace with the changing economy and progress in their careers. Australians will need to learn more in all stages of their lives. But our analysis shows that the need for training in additional skills is largest

in the later stage of a worker's career. While the average teenager and young adult will likely need to add only one hour of training per week to prepare for the more challenging world of work in 2040, **the time Australians spend between 21 years and retirement will need to triple from 2 hours to 6 hours per week** (see Exhibit 10).

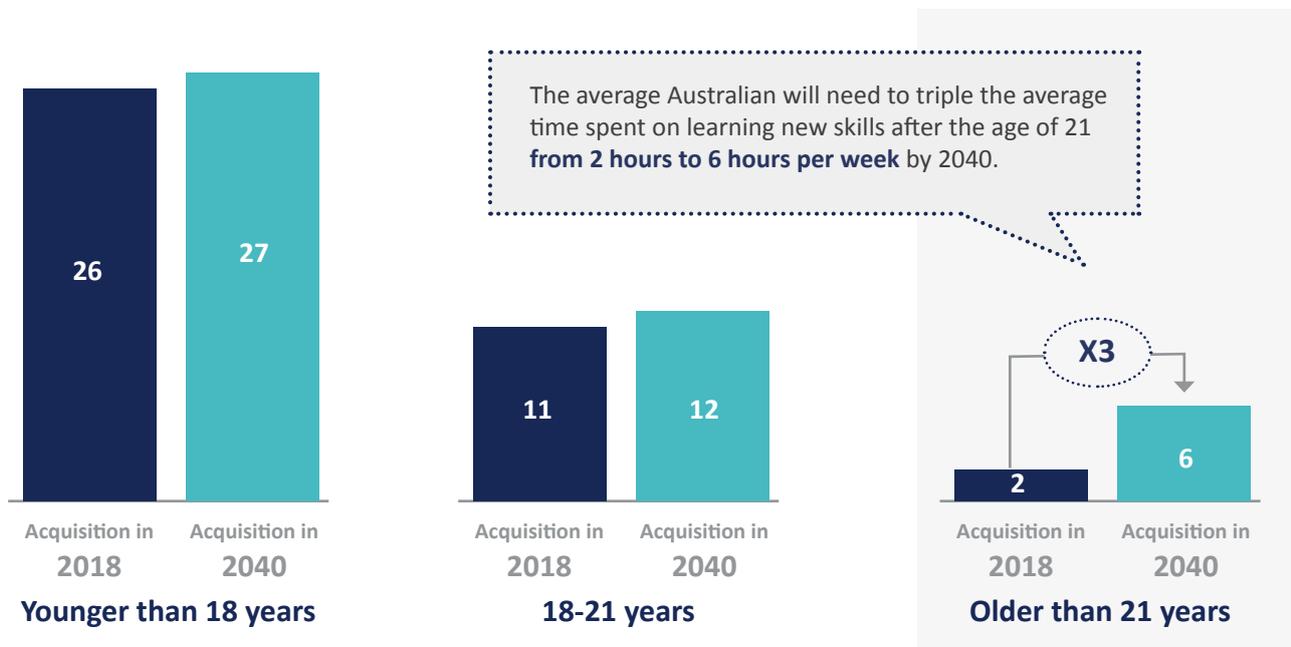
The need to view learning as a continuous process, rather than a mission mostly completed earlier in life, will force workers to reshuffle their priorities. By 2040, 41 per cent of the average worker's total education and training will need to occur after the age of 21, up from 19 per cent today (see Exhibit 11). It means the office, rather than a classroom, will play a much greater role in helping Australians acquire the skills they need in the future.

## EXHIBIT 10

### Australians will need to learn slightly more in younger years, but the time spent on learning new skills later in life will triple

#### Skill acquisition over a working life by age

Average weekly hours per person



Source: O\*NET, ABS, HILDA, AlphaBeta analysis

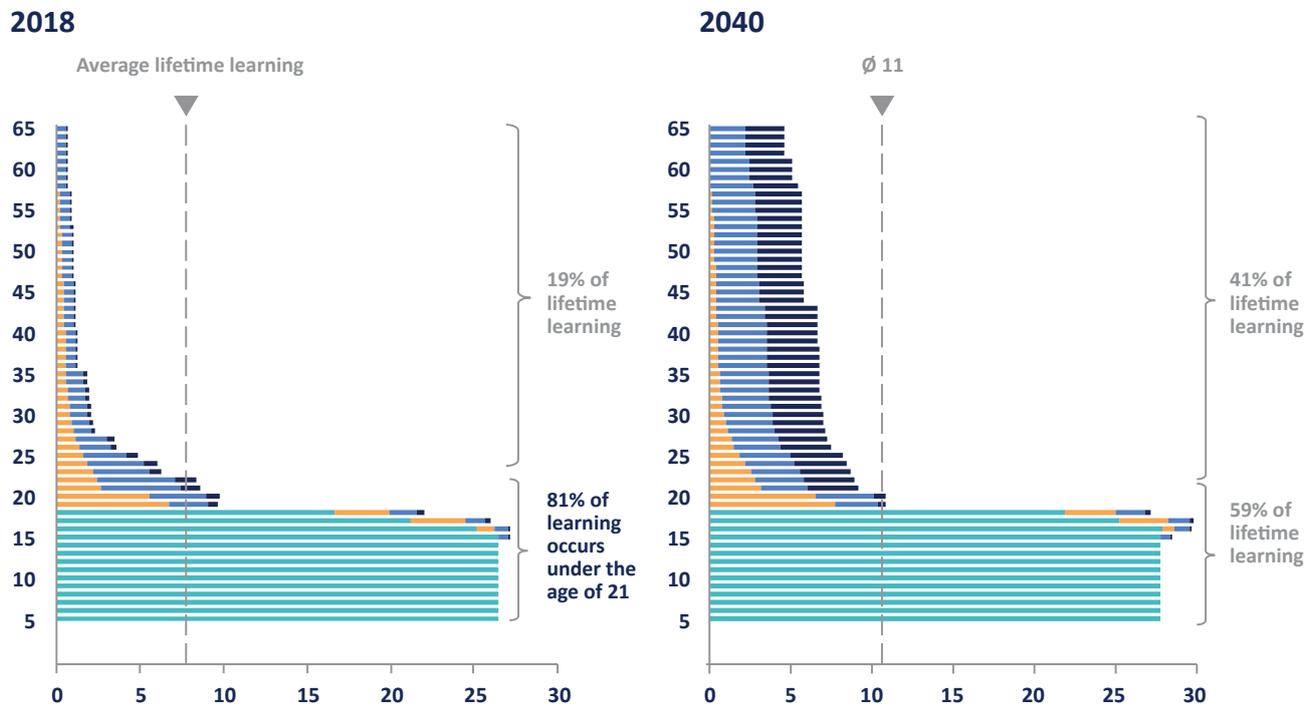
# EXHIBIT 11

The shift towards lifetime learning will cause Australians to acquire 41% of their skills later in life in 2040, up from 19% today

## Skill acquisition over a working life by age

Average weekly hours per person

- School
- Learning through university/VET (formal education)
- Learning on the job
- Learning through formal training



Source: O\*NET, ABS, HILDA, AlphaBeta analysis

## BOX 3

### Case study: Lifelong learning

#### New 'Skills Checkpoint' helps older Australians keep abreast of workplace change.

When the Australian Government piloted a new program in late 2015 to help older workers cope with the rapid changes in the labour market, officials soon realised they had tapped into a huge service gap. More than 1,000 people aged between 45 and 54 signed up for the Skills Checkpoint Pilot to find out whether their existing skills are still valued by employers or whether they'd need a refresh.

Some participants felt they'd already reached a dead end in their careers. "It can be very challenging to find new jobs, particularly as you age," one Australian told the organisers. "One can tend to doubt that the skill set already achieved in one's lifetime is sufficient to obtain another job." Others acknowledged their skills "haven't kept up" as they watched their industries decline, businesses close and risk of redundancy increase. One participant said he was getting too old for hard physical work after suffering from repeated injuries, but he lacked direction on what to do next.

#### A personalised career plan and a boost in confidence for participants

The Skills Checkpoint Pilot proved the missing link. Participants were screened for aptitude, skills and interests. Career advisors helped them explore alternative work paths and highlighted any additional education and training programs that would



facilitate a job or career change. They also offered information about how a worker can present individual skills in job applications and interviews. In the end, participants went home with a personalised career plan and a boost in self-esteem. "My experience with the Skills Checkpoint Service has lifted my confidence in my ability to put myself forward to get a new job," one worker said after the pilot.

The overwhelmingly positive feedback convinced the Australian Government to roll out the *Skills Checkpoint for Older Workers Program* across the country at the end of 2018, with more than \$17 million in funding. It will be available for any employee between 45 and 70 years old "at risk of entering the income support system", as well as eligible older workers who have recently become unemployed. The Government says it will pay for the reskilling and upskilling of up to 20,000 older Australians over a four-year period.

Source: Ministers for the Department of Education and Training (July 2018), "Skills Checkpoint for Older Workers Program tender opens". Media Release: <https://ministers.education.gov.au/andrews/skills-checkpoint-older-workers-program-tender-opens>. Australian Apprenticeship Support Network (2016), Skills Checkpoint Pilot. An overview of the evaluation findings. Available at: [https://www.australianapprenticeships.gov.au/sites/ausapps/files/publication-documents/report\\_-\\_executive\\_summary\\_of\\_the\\_skills\\_checkpoint\\_pilot\\_evaluation.pdf](https://www.australianapprenticeships.gov.au/sites/ausapps/files/publication-documents/report_-_executive_summary_of_the_skills_checkpoint_pilot_evaluation.pdf)



4

**HOW WE LEARN:  
MORE LEARNING  
WILL BE DELIVERED  
FLEXIBLY AND AT  
WORK**



Learning at work, instead of in a classroom, will need to become a priority for Australians in the era of artificial intelligence. To keep up with frequent job and task changes, workplace training will account for twice as much of a worker's lifetime investment in skills. By 2040, workers will undertake four times as much formal professional training throughout their working lives. The shift towards lifelong learning will challenge the traditional education system, as millions of Australians will seek to move flexibly between work and training in all stages of their career.

### **Much of the new learning will be work-based**

As technological development and economic incentives result in machines taking on a growing amount of work traditionally done by humans, Australians will need to change not only what and when they learn, but also how they learn. As outlined earlier in this report, Australians will need to shift their focus to tasks that rely

on their distinctively human characteristics. The future world of work also requires them to be highly responsive to ongoing changes at work. Consequently, learning throughout an individual's entire working life will need to become the standard for all Australians.

In practice, this means the workplace will need to become the most important arena for updating and refining a worker's skills. However, our analysis shows that many people focus too little on structured learning at work. The average Australian still acquires the bulk of their skills at school or in higher education. Once people join the workforce, their amount of time spent on training declines dramatically, compared to the hours they spend learning in younger years.

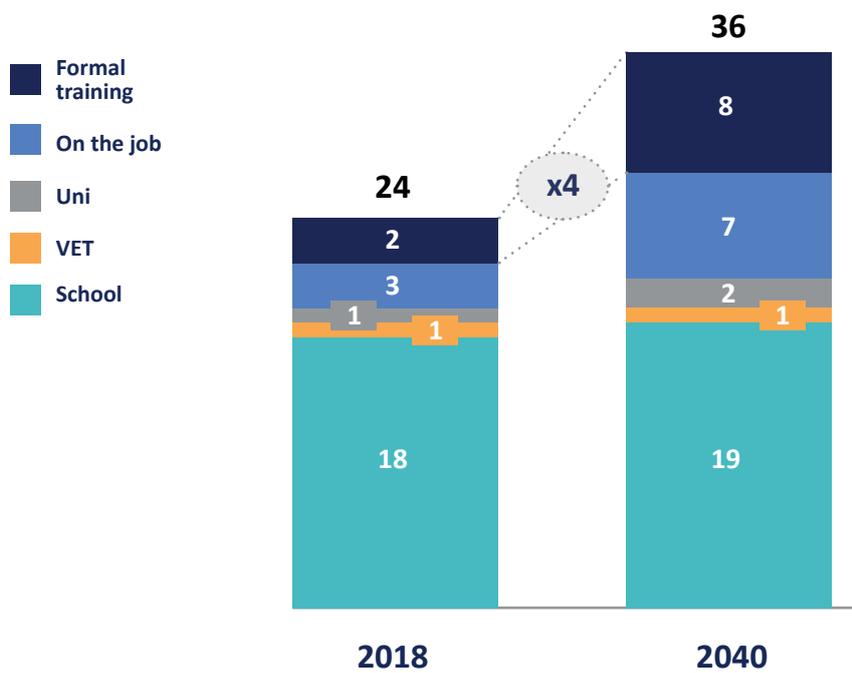
Workplace training – whether through formal professional development courses or informal on-the-job learning – currently only accounts for around one-fifth (21 per cent, or 5,000 hours of training) of the average Australian's total lifetime learning. As seen in Exhibit 14, this amount will need to increase substantially to 42 per cent (15,000 hours) as workplaces become more dynamic. **Formal training alone will need to quadruple by 2040, from a total of 2,000 hours over a worker's life today to 8,000 hours by 2040.** This required increase in formal training is driven by the growing need for reskilling and upskilling.

## EXHIBIT 12

By 2040 Australians need to quadruple the total time spent in formal training throughout their working lives

### Skill acquisition over a working life by source

Per person, in '000 hours



Learning at work (formal and on the job) as a share of total lifetime learning will need to increase from 21% to 42%. **Formal training** alone will need to **quadruple** by 2040.

This means Australians will need to increase their learning at work by **4 hours per week**.

Note: Excludes population growth, includes retraining of current workers.  
Source: O\*NET, ABS, HILDA, AlphaBeta analysis

## Learning will need to flexibly cater for mid-career workers

The growing need for lifelong learning will challenge the traditional model of acquiring skills in Australia. Much of the learning Australians undertake today follows a rigid path: at school, children learn foundational skills such as literacy and numeracy, as well as more specific knowledge about science, history and geography. At vocational colleges or at university, young adults acquire more specific knowledge to set them up for a professional career. Once in the workforce, people learn through experience whenever they perform their daily tasks on the job. Many employers also offer formal training opportunities to improve the skills of their staff.

In the future, Australians will need to be more flexible in how they learn, constantly revising and updating their skills to ensure their contribution remains relevant and meaningful as automation affects tasks within their job. More people will be working and studying at the same time. Some will seek to free up time during work hours to acquire new skills, while others will try to fulfil their growing learning needs outside of their work routine by taking evening, weekend or online courses. Education will need to become a lifelong journey that extends beyond formal institutional learning and into the workplace.

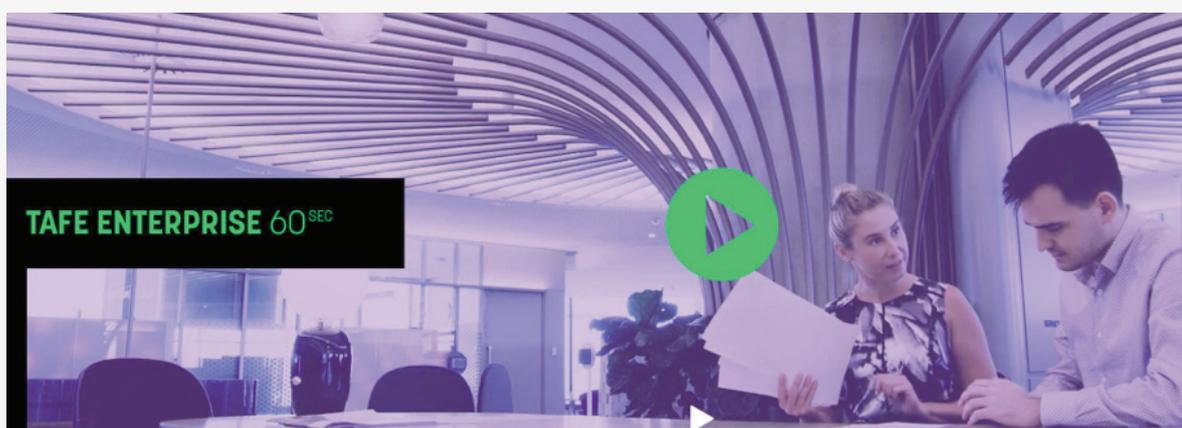
The change in how we work will be least noticeable during primary and high school years. Of course, schools will need to update curricula frequently to ensure their education remains fit for purpose. But the hours an average Australian will spend at school, and the overall concept of classroom education for children and young adults will change little compared to the sweeping changes that tertiary education providers and businesses are set to experience.

Universities and vocational training providers will need to step up in their role of supporting a skilled workforce by offering more flexible course structures that also cater for working professionals. Learning at university will need to become more accessible for Australians at all stages of their career. But instead of returning to university to enrol in traditional bachelor's or master's degrees that can take several years to complete, working Australians will seek out tertiary education providers that offer an array of short courses to fill a specific skills gap. Time constraints will lead many of them to prefer online tertiary education over courses that require physical attendance.

Employers will play a major role in fostering the shift to more flexible, lifelong learning. Many of the occupation-specific skills Australians need in the era of artificial intelligence are best acquired in the workplace through practice and repetition. Consequently, the way we spend our time at work will change. Learning and working will become increasingly inseparable. Not only will employers need to collaborate more closely with tertiary education providers to offer a growing amount of formal training. They will also provide an environment that fosters informal learning through mentoring and team collaboration, as workers will need to spend double as much time on "learning by doing" on the job (Exhibit 12) by 2040.

## BOX 4

### Case study: flexible learning at work



#### **How Australia’s largest vocational training provider draws working professionals with flexible online courses and a touch of virtual reality.**

More and more education providers in Australia are retooling their curricula to cater for a new type of student: the working professional. However, getting the course design right is critical for attracting business clients in Australia, says Jon Black, managing director at TAFE NSW, Australia’s largest provider of vocational education and training.

Every year TAFE Enterprise, the professional training arm of TAFE NSW, is meeting the skills needs of some 50,000 employees from all industries in Australia, including from blue-chip companies such as Microsoft, Cisco, Lendlease and Harley Davidson. Often, courses are custom-built for every corporation.

“When I talk with business leaders about their training requirements, the answer is always the same,” says Mr Black. “They want training solutions that are consistent enough to roll out across their organisation, but flexible enough to respond to changes in the commercial environment. What this reflects is a constantly evolving world of work where many skills and knowledge are perishable.”

For course co-ordinators at TAFE Enterprise this means a constant search for courses that fit into an employee’s busy schedule and into a company’s budget. The barriers for businesses to invest more in formal staff training are still substantial. In a recent TAFE survey among 400 large businesses in Australia nearly every second manager said it is difficult to motivate employees for training. Almost three quarters said they would struggle to free up employees for the required training time. 54 per cent cited a lack of training budget as a barrier.

Source: John Black (2018): “Meeting the training demands of industry”. Available at: <https://www.afr.com/news/special-reports/training-evolution/afrmar22sindustry-insighttafe-nsw-special-report---20180321-h0xsoe>; AFR/TAFE (2018), “Reskilling in the modern age”. Available at: <https://www.afr.com/news/special-reports/training-evolution/reskilling-in-the-modern-age-20180321-h0xsk2>; TAFE Enterprise (2018): Skills and Australian business report 2018. Available at: <https://www.tafensw.edu.au/documents/60140/86282/TAFE+Enterprise+Training+Report.pdf/bf500d82-3956-2ed5-5b39-b80d9c090dd5>.

---

TAFE thinks digital learning could be the answer to overcoming such hurdles. TAFE Digital is already offering more than 250 courses online. Some of these are deliberately kept short to help busy working professionals squeeze in evening or weekend studies. A specialist team of education professionals is also partnering with technology start-ups to make courses more engaging by using virtual and augmented reality software, as well as gamification strategies.

In the survey, seven in ten companies said they were willing to explore such high-tech training options to engage weary employees. “Businesses seeking a competitive edge are beginning to acknowledge the urgent need to upskill and reskill their existing workforce,” says Mr Black.

# IMPLICATIONS

A massive skill shift is required to prepare Australia's workforce for the automation age. We need to change what, when and how we learn to master the growing unpredictability of work. This has consequences for everyone in Australia, and governments and education providers must take the lead in driving reform.

The skill shift needed to prepare Australia's workforce for the future is enormous, and we need to take action now if we want to succeed as a country. Our analysis suggests that the Australian Government's recent "Gonski 2.0" recommendations are a good start, but schools are just one piece of the puzzle. Post-secondary education and training providers will need new approaches to support workers' lifelong learning needs. And governments can help by providing public funding models and financial incentives to encourage individuals and businesses to invest in education and training.

For the skill shift to be successful, four conditions must be met:

- **Make skills a priority.** Australians need to be willing and able to invest double as much time in new skills by 2040 to prepare our workforce for the future of work.
- **Create more flexible education and training opportunities.** Education providers need to adjust their teaching methods and content to cater for the growing demand in flexible, lifelong learning.
- **Adjust funding and certification models to encourage lifelong learning.** Governments and businesses need to provide incentives for workers to invest more time in learning new skills.
- **Get everyone involved.** Teaching new skills must be a collective effort from the heart of society. It involves schools, universities, TAFEs and employers as much as it draws on parents, sports coaches, and community leaders to act as role models.

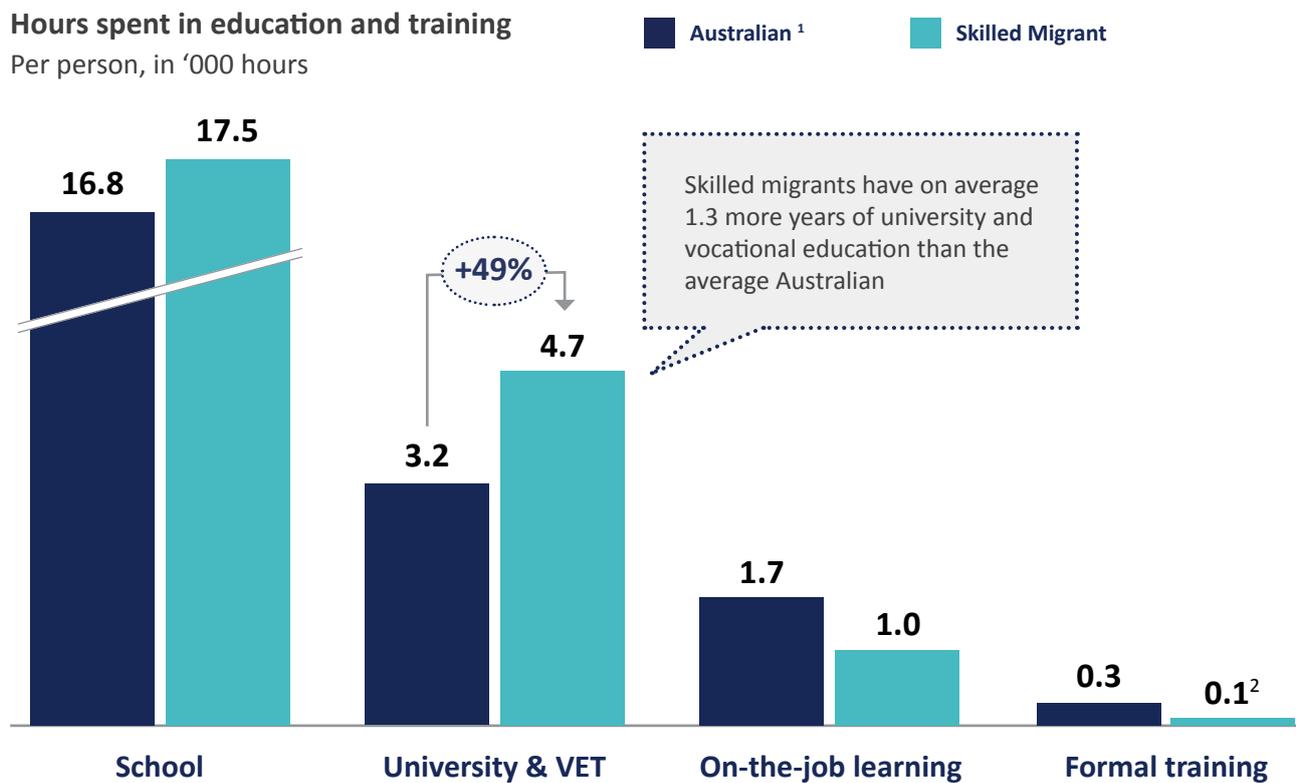
## Australia needs to invest dramatically more in skills

This report shows that Australia's workforce needs to urgently focus on what will matter most in the automation age: learning the skills that allow humans to thrive in an environment where they are using machines to perform an increasing number of tasks at work. Over the next two decades to 2040, Australia will need to double its total investment in education and training from a combined 300 billion hours to 600 billion hours.

Part of this immense need for skills is driven by population growth. Further still, one third of the human capital needs driven by population growth will be imported through skilled migrants. Australia's continued intake of skilled migrants will go a long way in lessening the burden on our education and training system, while ensuring the skill demands of a changing economy are met. Skilled migrants extend the depth and breadth of Australia's human capital, with the average skilled migrant spending 49 per cent more time in post-secondary education than the average Australian (Exhibit 13).

## EXHIBIT 13

The average skilled migrant has spent 49% more time in post-secondary education compared to the average Australian



<sup>1</sup> This only includes Australians born in Australia to avoid capturing previous intakes of skilled migrants.

<sup>2</sup> Skilled migrants have spent less time receiving formal training at work due to lower investment in formal training in developing countries. This is based on responses to the question on the extent of staff training (“In your country, to what extent do companies invest in training and employee development?”) in the World Economic Forum Global Competitiveness Index, which is used as a proxy for number of hours spent receiving formal training.

SOURCE: ABS, World Economic Form (WEF), AlphaBeta analysis

But even when leaving demographics aside, every Australian will need to invest significantly more time in education and training to keep up with the rapid changes in jobs and job tasks. Together, Australian workers will need to increase their total investment in skills by an additional 150 billion hours by 2040. In other words, the combined 300 billion hours people in Australia’s current workforce have already invested in skills over their working lives until today are nowhere near enough to prepare this country for the future. Collectively, Australians need to add another half of what they have already invested in skills to be ready for the changes ahead.

This growing skill requirement is driven by the rising need for reskilling and upskilling. Millions of people will need to retrain as they move from one job to another or completely change careers. Even those who stay in a role will need to be nimble and dedicate more time to learning at work, as machines will continue to take over a growing amount of human work tasks. Every worker in Australia, young and old, will require additional training and education to be ready for the challenges of the future.

Our analysis signals that formal training at work

will need to quadruple and learning after the age of 21 will need to triple over the course of a worker's life. Australia's youth will be particularly affected, as education and training become an even bigger priority. The next generation of workers, those who have not yet entered the labour market, will need to invest more time in skills than any worker generation before them. Our analysis shows that by 2040 young Australians will need to spend 3 more hours per week in education and training over the course of their careers compared to their parents.

## Education providers need to adjust teaching methods and content

But it will be a challenge for Australia's education system to keep up with the expected surge in demand for lifelong learning. At present, the system is not fully equipped to deliver the amount of education and training that is required to prepare Australian workers for the future of work.

Schools, universities, TAFEs and private vocational training institutions need to urgently step up in catering for a reskilling and upskilling revolution as they choose what and how education is delivered. For Australia's education system to remain globally competitive and succeed in equipping our workforce with relevant skills, every education provider will need to revise curricula and pedagogy.

In the future, employers will look for workers with specialist as well as cross-disciplinary skills, including the ability to lead and motivate people and communicate effectively. Schools will need to revise their approach, as highlighted recently by the Australian Government's latest Review to Achieve Excellence in Australian Schools, also known as "Gonski 2.0".<sup>15</sup> The review's key recommendation that fostering personal and social capability needs to be at the core of a school's curriculum and

teaching practice is in line with our analysis that human characteristics such as leadership and empathic communication will need to become more than twice as important in a worker's skill set by 2040.

Primary, secondary and tertiary education in Australia will continue to be crucial for developing the foundational, subject and cross-disciplinary skills in young people. But as learning becomes a lifelong journey, educators will need to adopt new approaches of supporting Australia's skilled workforce. In the future, there will be a growing need for flexible, bite-sized courses that allow workers young and old to quickly acquire the exact skills they need at a certain point in their careers. Demand for online courses will increase. Australia's education and training providers will need to adjust their teaching models to the era of 'fit-for-purpose' learning.<sup>16</sup>

The Australian education system is certainly aware of these challenges. Many universities have already begun to align current teaching models with a new vision for education – one that involves shorter, more flexible, more specialised courses that target younger and older Australians alike and can be completed online. TAFE Enterprise, now Australia's largest professional training provider, has set up its own unit, dubbed TAFE Digital Lab (see Case study: flexible learning at work) to reinvent vocational education for the 21st century. The Global Innovation Index, an annual survey on the innovative power of 126 countries worldwide, confirmed that Australia's tertiary education system remains one of the country's biggest assets, ranking it seventh on its scorecard.<sup>17</sup>

<sup>15</sup> Australian Government (2018), Through growth to achievement. *Report of the review to achieve educational excellence in Australian schools*. Available at: <https://www.education.gov.au/review-achieve-educational-excellence-australian-schools>.

<sup>16</sup> The Australian Productivity Commission, in a recent report, listed several barriers to upskilling and retraining that Australia would need to overcome. It recommended governments provide easier access to information, create improved VET pathways for upskilling, establishing 'lifelong learning accounts' and creating an independent assessment system to stimulate upskilling and retraining. See: *Australian Government Productivity Commission (2017), 5-year productivity review. Supporting paper no. 8: upskilling and retraining*. Available at: <https://www.pc.gov.au/inquiries/completed/productivity-review/report/productivity-review-supporting8.pdf>.

<sup>17</sup> Cornell University, INSEAD, World Intellectual Property Organisation (2018), *Global Innovation Index 2018*. Available at: <https://www.globalinnovationindex.org/home>.

### **Governments and businesses need to support the shift to lifelong learning**

The required shift towards lifelong learning can only occur if Australians are willing to learn more and if the education system moves to supply more and more flexible learning opportunities.<sup>18</sup> However, education providers rely on the support of governments and businesses when creating new course offerings.

Businesses are fundamental in providing insights about the skills they expect human workers to bring, guided in the medium term. To ensure overhauled curricula meet their standards, employers will need to collaborate closely with education and training providers. Employers need to create the space and structures for employees to join formal professional development training, which will need to quadruple by 2040, according to our analysis. They will also need to make more mentoring and on-the-job learning opportunities available, as demand for such informal training will need to double over the course of the average Australian's working life by 2040.

To help workers shift more easily from one role to another, employers should seek to identify as early as possible how technology and other forces will likely impact their workforce in the medium term. Transparent workforce plans would assist workers in identifying skill gaps and training needs that are in line with their next career moves.

Businesses will also need to consider providing early training to employees likely affected by automation and offshoring. This would lift the skills of vulnerable workers and increase their chances of redeployment elsewhere in a company. It would be equally important for employers to strengthen their pipeline of future talent. This may mean collaborating with schools or running community-based workshops – some technology companies

run holiday coding camps for children – to ensure the next worker generation is equipped with critical skills for the automation age.

Businesses in Australia have begun to reflect and develop solutions to respond to these growing training needs. For example, the Business Council of Australia recently launched a discussion paper outlining a vision for a new tertiary education model that would enable workers to more easily retrain and reskill over their lives.<sup>19</sup> Our analysis adds urgency to the responsibility of Australian businesses to support the reskilling revolution.

Governments need to provide the overall framework for the skill shift to succeed. Public funding models and financial incentives are important tools to incentivise individuals and businesses to invest in education and training. Governments need to make sure that existing funding frameworks encourage lifelong learning and ensure a 'funding neutrality' between vocational training providers and universities. This is particularly important as more education providers will need to introduce shorter, more flexible courses that cater for working professionals – a move that will directly pitch vocational training providers against universities and online education providers from the private sector, such as Udacity.

The proliferation of Massive Online Open Courses (MOOCs) shows that the education system is already changing in line with our analysis that shows learning will need to become more flexible in the future. However, recognition of and trust in these new types of learning will require the creation of a certification framework and cultural change.

Micro-credentials could be a way to structure the expected surge in non-traditional education offerings where students gain qualifications in specific areas such as learning how to code, how to use social media, or how to apply management skills such as staff supervision or strategic decision-

<sup>18</sup> The Australian Productivity Commission, in a recent report, listed several barriers to upskilling and retraining that Australia would need to overcome. It recommended governments provide easier access to information, create improved VET pathways for upskilling, establishing 'lifelong learning accounts' and creating an independent assessment system to stimulate upskilling and retraining. See: Australian Government Productivity Commission (2017), *5-year productivity review. Supporting paper no. 8: upskilling and retraining*. Available at: <https://www.pc.gov.au/inquiries/completed/productivity-review/report/productivity-review-supporting8.pdf>.

<sup>19</sup> Business Council of Australia (2017), *Future-proof: protecting Australians through education and skills*. Available at: <http://www.bca.com.au/publications/future-proof-protecting-australians-through-education-and-skills>.

---

making. Micro-credentials could be a way to recognise specific skill sets. They could be used to recognise classroom learning as well as any informal learning or training on the job. Employees could receive digital certificates or badges as evidence of attaining their new credential. Micro-credentials could be used for one-off qualifications or part of an employer-mandated training pathway.<sup>20</sup>

## Teaching new skills needs to be a whole-of-country effort

Responsibility for training does not rest solely with the education sector. Ultimately, everyone in Australia needs to embrace the required skill shift as a collective effort. Our analysis shows that basic foundational knowledge such as mathematics and English language will remain a pillar of a worker's skill set in 2040. Teaching such knowledge will remain the primary domain of primary and secondary schools.

As the uniquely human part of our skill sets will become more relevant, real-life education will need to play a bigger role. Research shows that tacit skills are typically acquired through experience and collaboration in a community.<sup>21</sup> This means everyone in society – parents, neighbours, piano teachers, sports coaches - will need to be aware that they are in the best position to teach children the characteristics that will help them succeed in the era of artificial intelligence. The required skill shift in Australia can succeed. But it requires everyone to step up and play their part.

<sup>20</sup> Oliver, Beverley (2017), Better 21C credentials. Evaluating the promise, perils and disruptive potential of digital credentials. Available at: [http://go.pardot.com/l/135221/2016-04-18/62kb7/135221/10220/Better\\_21C\\_Credentials.pdf](http://go.pardot.com/l/135221/2016-04-18/62kb7/135221/10220/Better_21C_Credentials.pdf).

<sup>21</sup> Psychologist Albert Bandura coined the concept of "social learning" in the 1970s. It recognises that children learn a lot by observing and copying patterns in the behaviour of people around them, including family members, peers, and even characters on TV. Other researchers have found a relationship between social media and tacit knowledge sharing. See for example Research by Panahi S./ Watson J./Partridge H. (2012), *Social media and tacit knowledge sharing: developing a conceptual model*: <https://pdfs.semanticscholar.org/1c40/e4bf2fedd618eb93406e29734ad294e512f4.pdf>.

# TECHNICAL APPENDIX

## A.1 Key features of our approach

### There are many different types of skills

- Not all skills are the same. There are important differences between knowledge, competencies, abilities and characteristics.
- Some of these skills (knowledge and competencies) are easier for machines to master than others (abilities and characteristics).

### Skills should be understood in combination as 'skill sets'

- Skills don't get tasks done independently. English language isn't enough to deliver the task of customer service. The worker also needs product information (knowledge), service orientation (ability) and social orientation (characteristic). In other words, workers need a combination of skills, or 'skill set', to complete a task.
- Even if a machine has mastered one codifiable skill, it will only replace a human worker once it has mastered the entire 'skill set' required to complete a task.
- This means humans still need a variety of skills, including skills that might be automatable, because they are always part of a 'skill set' that includes other skills machines cannot replicate.

### Skills needed for the future are different for different jobs

- Different workers will need to have different skill sets in the future, depending on their occupation. Workers in care industries may need more physical skills, while workers in professional services may need less. It would be misleading to conclude that certain 'average' skills will be most in demand in the future.

### Skills measured in terms of number of hours of training required

- We measure skills in a practical way – in terms of the number of hours of training required to deliver them.

## A.2 Estimating the current stock of skills in the economy

The methodology used in this report differs from existing reports, as it provides a quantifiable estimate of the impact of workforce changes including automation on the amount of education and training required for our workforce.

We estimate how many hours have been spent in education and training by workers currently in the labour force and what they have spent their time learning.

### A.2.1 How many hours have been spent in education and training by workers currently in the labour force?

The analysis begins by understanding how much time Australians currently in the labour force have spent in school, VET, university, on-the-job learning and formal mid-career training. We derive these estimates using ABS and Census data as described in Exhibit 14.

## EXHIBIT 14

### How much training do Australians in the labour force currently have?

Training Source		Estimation Method
School	Includes primary and secondary school	<b>Method &amp; assumptions:</b> Typical number of hours for each year in school x number of people who have completed each year of school. Source: Census
Vocational educational	Includes formal post-secondary qualifications including certificates and diplomas	<b>Method &amp; assumptions:</b> Typical number of hours in vocational education by qualification (i.e. diploma) x number of people who have completed vocational education by qualification. Source: Census
University	Includes bachelors, masters and doctorate degrees	<b>Method &amp; assumptions:</b> Typical number of hours in university by degree (i.e. Bachelors) x number of people who have completed university degree. Assumed a pre-requisite education profile by degree type i.e. if a person's highest level of educational attainment is Masters, they must have completed a Bachelor degree as well. Source: Census
On -thejob learning	Includes informal learning on the job	<b>Method &amp; assumptions:</b> Lifetime number of hours worked by labour force status (i.e part-time, full-time) and industry x proportion of time spent learning on the job (5%). Assume that everyone's labour force status and industry of work remains the same throughout their lifetime. Source: ABS, Census, O*NET
Formal mid-career training	Includes formal work training	<b>Method &amp; assumptions:</b> Lifetime number of hours worked by labour force status (i.e. part-time, full-time) and by industry x proportion of time spent in formal training by industry. Assumed that everyone's labour force status and industry of work remains the same throughout their lifetime. Source: ABS, O*NET

Another question we answer using ABS data is, how much time have we spent acquiring characteristics? These cannot exclusively be assigned to any education and training source. Although we recognise that personality characteristics can indeed be shaped by work experiences, experiences outside of education and training such as playing team sports, are just as important in the development of personal characteristics.<sup>22</sup> Therefore, we treat the learning of characteristics as a function of years lived. We assume that of an entire person's life, they spend 1 per cent of their lifetime learning characteristics.

Studies investigating the mean-level change in personality traits across the life course show that the development of personality traits is dynamic: while some traits are more likely to be developed in adolescence, others are developed later in life. For example, while people exhibit increases of certain traits in young adulthood (20 to 40) (such as conscientiousness and emotional stability), people decrease in measures of openness in old age.<sup>23</sup> We believe the best way to deal with this dynamism is to assume each year, on average, a person spends the same amount of time adopting characteristics.

<sup>22</sup> Niess, C & Hannes, Z (2015), *Openness to Experience as a Predictor and Outcome of Upward Job Changes into Managerial and Professional Positions*, PLoS One

<sup>23</sup> Roberts, BW, Walton KE & Viechtbauer W (2006), *Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies*, Psychological Bulletin 2006

## A.2.2 What have we been spending our time learning?

### Steps

1. **Collect O\*NET data on skills, knowledge, abilities and work styles (hereafter referred to as KSAW) covering 964 US occupations.**<sup>24</sup>

This data included importance scores for each KSAW, for each occupation, as well as level scores for each KSA. We also collect O\*Net data on the required education and training for each occupation.

2. **Assign each KSA a level and training source**

This data on KSAW was used to understand, for each occupation, where a typical worker acquired each of the skills that were relevant to their jobs. This data included level scores for each knowledge, skill and ability. We used these level scores to give each KSA a level rating of low, medium or high. This approach was taken to capture the nuances in education and training requirements for different occupations. For example, electricians may not necessarily

need the same level of mathematics knowledge as scientists, but they will still require some mathematics knowledge. We then assign each KSAW level to a training source (school, university, VET, on-the-job learning and formal training) based on assumptions on where the KSAW would be acquired.

3. **Calculate hours assumptions for each training source**

We use O\*NET data on required education and training for each occupation as the starting point for converting skill requirements into hours. O\*NET provides data on 41 training categories (school, different types of post-secondary education, as well as time spent in formal training and work experience). We map these to equivalent Australian qualifications, where necessary. We then calculate the typical number of hours for each of O\*NET's 41 training categories. For example, the number of hours assumed to complete a Bachelor degree is calculated as 37.5 hours a week x 32 weeks x 3 years = 2700 hours. This is described in Exhibit 15.

## EXHIBIT 15

### How much training do Australians in the labour force currently have?

O*NET Category	Mapping to categories in A.2.1	Method
Required Level of Education (1 – 12 sub-categories)	School, university, VET	Map the university and VET qualifications to Australian qualifications
Related Work Experience (1 – 11 sub-categories)	On-the-job learning	Assume 5% of time in work experience was spent learning (same assumption as in A.2.1)
On-site or In-Plant Training (1 – 9 sub-categories)	Formal professional training	Apply the average share of hours per year on formal training (derived from ABS in A.2.1) to the time categories specified in O*NET
On-The-Job Training (1 – 9 sub-categories)	Formal professional training	Apply the average share of hours per year on formal training (derived from ABS in A.2.1) to the time categories specified in O*NET

<sup>24</sup> The US Department of Labor's O\*NET database is one of the world's richest sources for labour data. The database contains information on the importance of over 130 knowledge, skills, abilities and workstyles across 964 US Standard Occupation Classification (SOC) Codes.

#### 4. Create a cumulative training profile for each occupation

Let  $F$  be a matrix of shares of training type required, for each occupation, where  $F_{i,j}$  corresponds to the frequency of the occupation  $i$  that requires the training type  $j$  (high school, bachelors, 1-3 months formal training etc).  $S$  is a matrix of the amount of time spent on each training source (e.g.  $s_1$  can be the amount of time spent completing a high school degree). The matrix of the weighted average number of hours spent on each training type for every occupation is given by  $T$  under the following equation:

$$\begin{bmatrix} f_{1,1} & \cdots & f_{1,s} \\ \vdots & \ddots & \vdots \\ f_{o,1} & \cdots & f_{o,s} \end{bmatrix} \times \begin{pmatrix} I(s) \\ \begin{bmatrix} s_1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & s_s \end{bmatrix} \end{pmatrix} = \begin{bmatrix} t_{1,1} & \cdots & t_{1,s} \\ \vdots & \ddots & \vdots \\ t_{o,1} & \cdots & t_{o,s} \end{bmatrix}$$

We redefine  $S$  based on groupings of O\*NET training sources to consist of 6 training sources: school, university, on-the-job learning and formal professional training. These results are aggregated to calculate, for each occupation, the total number of hours required at each training source.

#### 5. Estimate time training on each relevant skill for each occupation

To estimate, the number of hours each occupation has spent on each relevant skill, we begin with assessing which skills are relevant to each occupation. We create an occupation importance score matrix, which stores O\*NET's importance score data for each KSAW, for each occupation. We assume that if a KSAW has an importance score greater than 3, the KSAW is relevant to the occupation (Scale of 1-5, where 3 is the minimum score that O\*NET uses to assess relevance of KSAW to occupation). Based on the assignment of KSAWs to training sources, we create a  $o \times k$  binary value matrix  $R_s$  where  $o$  the number of occupations and  $k$  is the number of skills.

Elements take a value of 1 over the number of skills learnt at source  $s$  if the skill is important to an occupation, and the skill is acquired at that source of education:

$$R_s = \begin{bmatrix} r_{1,1}(s) & \cdots & r_{1,k}(s) \\ \vdots & \ddots & \vdots \\ r_{o,1}(s) & \cdots & r_{o,k}(s) \end{bmatrix}$$

where  $\begin{cases} r_{k,o}(s) = \frac{z_{k,o,s}}{\sum_{k \in K, o \in O, s \in S} z} \in \{0,1\} & k \in K \text{ where } z = 1 \text{ if } (\text{imp}_{k,o} \geq 3) \ \& \ (\text{source}_k = s) \\ r_{k,o}(s) = 0 & \text{if } (\text{imp}_{k,o} < 3) \ \text{or } (\text{source}_k \neq s) \end{cases}$

The time spent on training for each skill by each occupation by source  $s$  for each source is given by:

$$OK_s = \begin{bmatrix} ok_{1,1}(s) & \cdots & ok_{1,k}(s) \\ \vdots & \ddots & \vdots \\ ok_{o,1}(s) & \cdots & ok_{o,k}(s) \end{bmatrix} = \begin{pmatrix} T(s) \\ \vdots \\ 0 \end{pmatrix} \times R_s = \begin{bmatrix} r_{1,1}(s) & \cdots & r_{1,k}(s) \\ \vdots & \ddots & \vdots \\ r_{o,1}(s) & \cdots & r_{o,k}(s) \end{bmatrix}$$

- 6. We recategorise O\*NET data on skills, knowledge, abilities and work styles (KSAW) into three capability clusters: knowledge, abilities and characteristics as shown in Exhibit 16

## EXHIBIT 16

How much training do Australians in the labour force currently have?

Skill Groups	Abilities	Knowledge	Skills	Work Styles
Knowledge		✓		
Abilities	✓		✓	
Characteristics				✓

7. We aggregate the results for each cluster based on the recategorisation in Exhibit 16
8. We then apply these 2014 estimates to 2018 occupation data (i.e. the number of people in each occupation) to calculate the total stock of hours for each capability cluster acquired by people in the 2018 labour force
9. We align these estimates with ABS data on total stock from each source estimated in A.2.1

We adopt a different approach to work styles (recategorised characteristics) because we cannot neatly assign a training source to work styles. This is because the development of characteristics can occur outside formal education and training settings. Therefore, we cannot use the change in required education and training for each occupation to imply the changes in time spent learning work styles as we have done for knowledge, skills and abilities.

We use the historical change in O\*NET's importance scores for work styles as a proxy for the change in required training time, to derive a growth rate to be applied to our 2018 stock of hours (that is, hours spent acquiring characteristics). We test the significance of applying a different methodology to work styles, by doing a like-for-like comparison in the change in importance scores for all KSAWs over the time period. We observe a significant difference in the change in importance scores for work styles, as compared to all other KSAs. The average historical change was 8 times larger than the change for all other KSAs. Therefore, if we had applied this method to other KSAs, this would have yielded an even larger growth rate for characteristics. Accordingly, there is plausible reason to believe that our estimate of the change in characteristics is conservative. We apply another precaution to avoid overestimating the growth in characteristics by discounting the growth rate for work styles. We apply a conservatism factor of 20% to the growth rates for each work style.

We translate the results of the US data analysis into the Australian context. This report determines how training hours have changed in the Australian economy by matching US occupations with their Australian equivalent using concordance tables. To complete the picture, and determine Australian education and training trends, it combines occupational training data with Census data on

An exception to the above method is how we estimate how much time has been spent learning each KSA in school. Here, we use existing Australian data on school subjects and recommended teaching time for each subject, for each year of school, to calculate the share of time spent learning each subject.<sup>25</sup> We then map subjects in the school curriculum to KSAs from O\*NET using the level scale anchors. Taking the current stock of hours spent in school estimated in Section A.2.1, we distribute this across these subjects, according to shares for each KSA cluster. Finally, to calculate the total time spent learning each KSA, we apportion the respective time spent on each individual subject to the number of relevant KSAs to calculate the total time spent learning each KSA.

<sup>25</sup> *Time allocations and entitlement – Advice on implementing the Australian Curriculum F(P) – 10*, Queensland Studies Authority (QSA), based on information available in 2011

## A.3 Estimating the stock of skills required in 2040

To understand how education and training requirements will change over the next 22 years, we take, for each source of education, observations of Occupation/Skill (OK) training hours at different points in time. This allows for a detailed analysis of changes within and between jobs. For example, by taking the difference between OK2006 and OK2014, the total change in hours spent on each skill is given for the elapsed time period. We calculate annual growth rates between 2006 and 2014 and use this to extrapolate our initial 2018 estimates to 2040 to estimate the impact of task changes on required training hours.

There are a few exceptions to this overall approach. As stated in Section A.2, we do not use O\*NET data to estimate time spent in school, and therefore the changes associated with learning at school. Instead, we assume an individual's maximum time spent in school will not change but do take into account population growth and rising completion rates using ABS and Census data.

Furthermore, we use historical Australian trends on growth in university completion from the Census, to predict overall change in university hours in the future. We then use the results from the O\*NET analysis to distribute the change in hours across knowledge, abilities and characteristics.

To account for the fact that workers who are over the age of 25 are unlikely to return to university, we reappportion the additional training attributable to these workers from university to formal professional training. We assume that the share of the labour force that is over 25 over the period, is constant.

### A.3.1 Estimating retraining hours

#### Steps

1. Project labour force growth to 2040 using ABS data on historical labour force growth rate. Estimate the number of new workers added each year, and the number of remaining current workers.
2. We use annual HILDA data to understand the frequency of job changes in the labour force. We determine the percentage of people who:
  - Stay in the same occupation, and same industry (this includes changes in employer)
  - Move to a different occupation, but stay in the same industry
  - Move to a different industry, but stay in the same occupation
  - Move to a different occupation and different industry
3. Assuming those percentages stay constant, we can calculate the instances of movement across the labour force over the next 22 years for both groups of workers, current and future. That is, for each year, we calculate the number of people who stay in the same job, move to a different occupation but stay in the same industry etc.
4. We assign each scenario a retraining profile (Exhibit 17)

## EXHIBIT 17

Scenario	University or VET	Formal training	On-the-job training
Move to a different industry, but stay in the same occupation		✓	
Move to a different occupation, but stay in the same industry		✓	✓
Move to a different occupation and different industry	✓	✓	✓
<b>Retraining hours</b>	Weighted average of university and VET hours for Bachelors or Cert IV qualification	1 year of the average annual time spent in formal professional training	1 year on-the-job learning, learning at 25% of time working

- We aggregate the instances and types of job movement to estimate the overall retraining hours that will need to be undertaken from now to 2040.
- We distribute these total retraining hours across knowledge, abilities and characteristics based on their respective shares of total hours in 2040 determined from analysis in Section A.3

To understand how many hours of training an average person acquires over their working life in 2018, we divide the total training stock in hours by the current number of people in the labour force. For 2040, population growth was removed, and the 2040 stock of skills was divided by the number of workers in 2018 to estimate hours of training per person over their lifetime.

### A.4 Measuring how many workers may change jobs by 2040

This report seeks to quantify the need for reskilling by examining the likelihood of occupation change among people who are currently part of the Australian workforce. We use HILDA survey data on occupation change to estimate the probability of a person changing occupation in a given year, and then simulate how many people will likely stay in their existing occupation, and how many might leave, for each year between 2018 and 2040. We also assess how likely these occupation changes are for different age groups. We use a Monte Carlo simulation (a process to model the probability of different outcomes) to evaluate how many people we expect to change occupations never, once, twice, three times, or four times or more by 2040.

## A.5 Measuring task change in Australian occupations

The analysis of task change in Australia is based on information from the US government's O\*NET database. The O\*NET database contains detailed information on more than 2,000 work-related activities for over 1,000 occupations. It includes data on how often a worker performs certain tasks in a job, regardless of whether these tasks require manual work or brain work.

We analysed task-related data for the years 2006 and 2014 and extrapolated the trends we observed into the future to cover the decade between 2006 and 2016. In a first step we converted the data on task frequency into timeshares and fitted it to match the total weekly work hours for each occupation. We then used a unique method to measure how the time workers spend on each task changed per year.

Changes in the time workers spent per task were summed up for each occupation and for the economy as a whole. In a final step, we translated our results into the Australian context by converting American occupations into equivalent Australian occupations using concordance tables mapping US SOC and ANZSCO codes.

## A.6 Measuring the fastest growing skills

### Steps

1. Undertake analysis in A.2 and A.3, however do not aggregate results into capability clusters (knowledge, abilities and characteristics)
2. Calculate average annual growth rates in hours for each KSAW and level (approximately 500+), for each occupation cluster
3. Rank each KSAW in each occupation cluster based on annual growth rates

## A.7 List of skills covered by this analysis

See Exhibit 18

## EXHIBIT 18

KNOWLEDGE		
<ul style="list-style-type: none"> <li>▪ Psychology</li> <li>▪ Sociology and Anthropology</li> <li>▪ Geography</li> <li>▪ Therapy and Counseling</li> <li>▪ Education and Training</li> <li>▪ English Language</li> <li>▪ Foreign Language</li> <li>▪ Fine Arts</li> <li>▪ History and Archaeology</li> <li>▪ Philosophy and Theology</li> <li>▪ Public Safety and Security</li> <li>▪ Law and Government</li> </ul>	<ul style="list-style-type: none"> <li>▪ Administration and Management</li> <li>▪ Clerical</li> <li>▪ Customer and Personal Service</li> <li>▪ Personnel and Human Resources</li> <li>▪ Transportation</li> <li>▪ Production and Processing</li> <li>▪ Food Production</li> <li>▪ Computers and Electronics</li> <li>▪ Engineering and Technology</li> <li>▪ Design</li> <li>▪ Building and Construction</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mechanical</li> <li>▪ Mathematics</li> <li>▪ Physics</li> <li>▪ Chemistry</li> <li>▪ Biology</li> <li>▪ Medicine and Dentistry</li> <li>▪ Telecommunications</li> <li>▪ Communications and Media</li> <li>▪ Economics and Accounting</li> <li>▪ Sales and Marketing</li> </ul>
ABILITIES		
<ul style="list-style-type: none"> <li>▪ Arm-Hand Steadiness</li> <li>▪ Manual Dexterity</li> <li>▪ Finger Dexterity</li> <li>▪ Control Precision</li> <li>▪ Multilimb Coordination</li> <li>▪ Response Orientation</li> <li>▪ Rate Control</li> <li>▪ Reaction Time</li> <li>▪ Wrist-Finger Speed</li> <li>▪ Speed of Limb Movement</li> <li>▪ Static Strength</li> <li>▪ Explosive Strength</li> <li>▪ Dynamic Strength</li> <li>▪ Trunk Strength</li> <li>▪ Selective Attention</li> <li>▪ Time Sharing</li> <li>▪ Monitoring</li> <li>▪ Time Management</li> <li>▪ Management of Financial Resources</li> <li>▪ Management of Material Resources</li> <li>▪ Management of Personnel Resources</li> <li>▪ Programming</li> <li>▪ Perceptual Speed</li> <li>▪ Spatial Orientation</li> <li>▪ Visualization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stamina</li> <li>▪ Extent Flexibility</li> <li>▪ Dynamic Flexibility</li> <li>▪ Gross Body Coordination</li> <li>▪ Gross Body Equilibrium</li> <li>▪ Oral Comprehension</li> <li>▪ Written Comprehension</li> <li>▪ Oral Expression</li> <li>▪ Written Expression</li> <li>▪ Active Listening</li> <li>▪ Speaking</li> <li>▪ Active Learning</li> <li>▪ Social Perceptiveness</li> <li>▪ Coordination</li> <li>▪ Persuasion</li> <li>▪ Negotiation</li> <li>▪ Instructing</li> <li>▪ Service Orientation</li> <li>▪ Critical Thinking</li> <li>▪ Learning Strategies</li> <li>▪ Complex Problem Solving</li> <li>▪ Judgment and Decision Making</li> <li>▪ Systems Analysis</li> <li>▪ Systems Evaluation</li> <li>▪ Speed of Closure</li> </ul>	<ul style="list-style-type: none"> <li>▪ Operations Analysis</li> <li>▪ Technology Design</li> <li>▪ Equipment Selection</li> <li>▪ Installation</li> <li>▪ Operation Monitoring</li> <li>▪ Operation and Control</li> <li>▪ Equipment Maintenance</li> <li>▪ Troubleshooting</li> <li>▪ Repairing</li> <li>▪ Quality Control Analysis</li> <li>▪ Reading Comprehension</li> <li>▪ Writing</li> <li>▪ Mathematics</li> <li>▪ Science</li> <li>▪ Fluency of Ideas</li> <li>▪ Originality</li> <li>▪ Problem Sensitivity</li> <li>▪ Deductive Reasoning</li> <li>▪ Inductive Reasoning</li> <li>▪ Information Ordering</li> <li>▪ Category Flexibility</li> <li>▪ Mathematical Reasoning</li> <li>▪ Number Facility</li> <li>▪ Memorization</li> <li>▪ Flexibility of Closure</li> </ul>
CHARACTERISTICS		
<ul style="list-style-type: none"> <li>▪ Achievement/Effort</li> <li>▪ Persistence</li> <li>▪ Initiative</li> <li>▪ Leadership</li> <li>▪ Cooperation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Concern for Others</li> <li>▪ Social Orientation</li> <li>▪ Self Control</li> <li>▪ Stress Tolerance</li> <li>▪ Adaptability/Flexibility</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dependability</li> <li>▪ Attention to Detail</li> <li>▪ Integrity</li> <li>▪ Independence</li> <li>▪ Innovation</li> <li>▪ Analytical Thinking</li> </ul>

## A.8 Education and training hours assumptions

## EXHIBIT 19

Qualification	Hours	Calculation
Certificate III	2,400	37.5 weeks a year x 32 weeks a year x 2 years
Certificate IV	1,200	37.5 weeks a year x 32 weeks a year x 1 year
Diploma	2,400	37.5 weeks a year x 32 weeks a year x 2 years
Associate Degree	2,400	37.5 weeks a year x 32 weeks a year x 2 years
Advanced Diploma	3,600	37.5 weeks a year x 32 weeks a year x 3 years
Bachelor Degree	3,600	37.5 weeks a year x 32 weeks a year x 3 years
Graduate Certificate	600	37.5 weeks a year x 32 weeks a year x 0.5 years
Graduate Diploma	1,200	37.5 weeks a year x 32 weeks a year x 1 year
Master Degree	2,400	37.5 weeks a year x 32 weeks a year x 2 years
Professional Specialist Qualification, Doctoral Level	4,800	37.5 weeks a year x 32 weeks a year x 4 years
Doctoral Degree Level	4,800	37.5 weeks a year x 32 weeks a year x 4 years
Postgraduate Degree Level	3,600	37.5 hours per week x 32 weeks a year x 3 years



produced by

**αlphaβeta**  
strategy x economics