



Case for Change

Printing and Graphic Arts

ICP

Case for change

September 2017

Review industry skills needs
for 3D printing

Version 2.0 – September 2017
For STA Review

Administrative information

Name of IRC: Printing and Graphic Arts IRC

Name of SSO: PwC's Skills for Australia

Name of Training Package: Printing and Graphic Arts

Case for Change: Review industry skills needs for 3D printing

This case for change was established as a result of initial research and consultations outlined in the Industry Skills Forecast and Proposed Schedule of Work for the Printing and Graphic Arts IRC and subsequent endorsement by the Australian Industry and Skills Committee (AISC).

The objective of this project is to consider how vocational education and training may be used to provide workers across a variety of industries with skills in 3D printing technologies.

This Case for Change was agreed to by the Printing and Graphic Arts IRC.

Andrew Macaulay



29/8/17

ICP IRC Chair

Signature of Chair

Date

The case for change

Industry drivers for change

This project is proposed in response to the following industry drivers for change:

1. **3D printing is a key technology driving rapid change across multiple industries**, including the aviation, architecture, automotive, commercial manufacturing, dental, medical, education, construction, mining, financial, insurance and legal sectors. The Printing and Graphic Arts Industry Skills Forecast and Proposed Schedule of Work notes that 3D printing is recognised as one of the most important technologies expected to have a cross-industry worldwide impact in the near future. Currently the AISC has not identified 3D printing as a cross sector project, however consultation across industries will be undertaken to ensure relevance¹.
2. Despite 3D printing representing a 'paradigm shift in design and production'² that will affect multiple industries, **existing training is failing to adequately equip learners with the skills and knowledge required to design 3D prints or operate, maintain, install and provide training around 3D printers, leading to a shortage of capable workers.**³
3. An opportunity exists for the Printing and Graphic Arts sector in particular, and the VET sector more broadly, to provide training in the design of 3D prints and the installation and operation of 3D printers that will help address the existing skills shortages in 3D printing. This **training will offer opportunities to workers across multiple industries to reskill or upskill in order to meet industry demand.**

¹ PwC (2016). *Tech Breakthroughs Megatrend: How to prepare for its impact.*

² Deloitte (2016). *Additive manufacturing and the workforce of the future.*

³ *Industry feedback in consultation.*

Recommended changes

1. Amend the three units of competency included in the ICPS00002 3D Print Fundamentals Skill Set to improve their currency and applicability to the needs of workers in 3D printing job roles across multiple industries. These units are: ICPPRN395 Set up and produce a 3D print, ICPPRP398 Set up and produce a 3D scan, and ICPPRP495 Manipulate 3D graphics files in preparation for printing.
2. Develop one new unit of competency to address an existing skills gap: Operate and maintain a 3D printer. This unit will aim to provide generalist skills to owners and operators of 3D printers to ensure consistent operation.
3. Review the structure and purpose of ICPS00002 3D Print Fundamentals Skill Set to ensure it is meeting industry needs.

As a result of this review, the skill set ICPS00002 may be amended to include additional existing units from other Training Packages. Relevant units from other Training Packages include MEM09010C Create 3D models using computer aided design system, BSBDES303 Explore and apply the creative design process to 3D forms, and 3D design units from the CUA Culture and Related Industries Training Package.

Industry support for change

Industry views were captured via targeted interviews. The method and scale of stakeholder consultation undertaken in building the Case for Change is outlined in the Attachment – *Stakeholder consultation method and scale*.

Three key issues were identified during consultation:

1. **It is important for training to capture all elements of the 3D printing process - which includes print design, print production, and customer service - but a majority of jobs will be in design.**
 - In most industries, jobs in 3D printing will be most common in the ‘design’ part of the 3D printing operational cycle, so training should predominantly address skills linked to the design of 3D prints. Workers in job roles with a design focus will require skills that blend engineering, software use and development, and artistry. Existing training fails to ensure that learners are equipped with these skills.⁴
2. **There are jobs roles in the operation, maintenance and repair of 3D printing machines for which no nationally-endorsed training currently exists.**
 - 3D printing machines require technicians to look after them, similar to photocopying machines require technicians to service them. The maintenance of 3D printing machines requires different skills to the design and production of 3D prints, yet no nationally-endorsed training exists in maintaining 3D printing machines.
 - The lack of well-trained 3D printer technicians is likely to be slowing the uptake of 3D printing technology throughout the economy.⁵
3. **Training in 3D Printing needs to be suitable for the existing and future needs of a large variety of industries.**
 - 3D printing is becoming a significant part of many industries, rather than becoming an industry itself. This trend is reinforced by the prominence of 3D printing technology as part of the government’s agenda to promote STEM, which cuts across multiple industries and sectors of the

⁴ *Industry feedback in consultation.*

⁵ PwC (2017). *Printing and Graphic Arts Industry Skills Forecast and Proposed Schedule of Work.*

economy.⁶ Although the uses of 3D printing vary significantly across industries, the skills required to design and produce 3D prints are similar regardless of the industry. This means that training should be cross-sectoral rather than contained to a particular industry.

Outstanding issues and dissenting views

Outstanding issues and dissenting views are listed in the Attachment - *Stakeholder consultation method and scale*.

Impact of change

The table below outlines how stakeholders may be impacted by changes recommended in this case for change:

Stakeholder	Impact
Industry / Employers / Learners	<ul style="list-style-type: none"> Improving the portability of skills to enable workers to make career transitions across industries. Improved understanding of more efficient production methods for employers. Greater integration of 3D technologies in industries, reducing costs and improving outcomes across various fields. For example, 3D printing will allow medical implants to be easily modified to suit the needs of individuals. Workers who currently utilise flat printed objects will be able to operate in the 3D space to produce 3D designs and outputs.
Registered Training Organisations	<ul style="list-style-type: none"> Improved relevance of training to the needs of a wide variety of industries. New UoCs provide avenues for upskilling trainers and assessors.

Risks of not implementing proposed changes

The base case (the ‘do nothing’) option must be considered as an alternative to the proposed changes in order to enable effective comparison between the two scenarios. This option negates the need for investment in training products, however does not address the current state issues identified. The likely impacts of this option are outlined below:

Existing issue	Likely impact(s) if not addressed
<i>It is important for training to capture all elements of the 3D printing process - which includes design, production, and customer service - but most jobs will be in design.</i>	Choosing not to consider training across the broader 3D printing process may lead to skills gaps being created that negatively impact the uptake of 3D printing technology across industries, preventing the technology significant cost reduction and revenue creation across various sectors. Furthermore, significant opportunities for value adding in areas such as weight saving and material reduction may not be captured if such training is not provided.
<i>There are jobs roles in the use, maintenance and repair of 3D printing machines for which no</i>	Choosing not to provide learners with training in how to use and maintain 3D printing machines will mean a failure of the training system to respond to industry demand, and will create a shortage

⁶ Department of Industry, Innovation and Science (2015). *STEM skills the key to Australia’s economic success*.

nationally-endorsed training currently exists of workers with skills related to 3D printing, potentially hindering the uptake of 3D printing technology throughout industries.

Training in 3D Printing needs to be suitable for the existing and future needs of a large variety of industries. As 3D printing is used in multiple industries, rather than being an industry itself, if training cannot be adapted to suit the needs of multiple sectors then there is a risk of certain industries will be unable to capitalise on the opportunities provided by 3D printing technology.

Timeframes

PwC’s Skills for Australia anticipates that a Case for Endorsement for the ICP Training Package will be submitted to the Australian Industry and Skills Committee (AISC) in July 2018.

Implementing the COAG Industry and Skills Council reforms for Training Packages

The table below outlines how the changes recommended in this case for change support the CISC reforms for Training Packages:

Reform	Evidence of reform being addressed
<i>Removing obsolete and superfluous qualifications from the training system</i>	The training package components in the scope of this Case for Change are meeting skills needs for which no other training currently exists. No obsolete or superfluous training package components were identified during industry consultations.
<i>Making more information available about industry’s expectations of training delivery</i>	Training package components will be written so they align with industry expectations for training delivery, and will be released with a ICP Companion Volume that provides additional information.
<i>Ensuring the training system better supports individuals to move easily from one related occupation to another</i>	Training package components will be amended to ensure they are providing learners with skills in 3D printing that are transferable across industries and occupations.
<i>Improving the efficiency of the training system by creating units that can be owned and used by multiple industry sectors and housing these units in a work and participation bank</i>	ICP units will be amended to ensure they provide training which is relevant across multiple industries. Units from other Training Packages, such as the CUA Training Package, will be considered for inclusion in training relevant to the ICP Training Package.
<i>Fostering greater recognition of skill sets</i>	The skill set ICPSS00002 is recognised as a principle component of 3D printing training. This project will review this skill set to ensure it is meeting industry needs.
<i>Ensuring that accredited courses ‘fill the gap’ in training packages and provide for training courses to be developed as quickly as industry needs them and support niche skill needs</i>	The proposed new UoC will enable more options for importation and contextualisation into accredited courses.