What can TAFEs do to engage more with employers to develop apprenticeship programmes – The Cadetship (The New Degree Apprenticeship).

Leonard Spain

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International Specialised Skills Institute

Victorian Skills Authority

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The Victorian Skills Authority works in partnership with the International Specialised Skills Institute by funding the VET International Practitioner Fellowships. The Fellowship program focuses on developing opportunities within the VET sector to assist in building an Education State in Victoria that produces excellence and reduces the impact of disadvantage. In addition, the program is funded to support the priorities of Skills First, including developing capacity and capability, innovative training practices and increasing teacher quality within the VET sector as well as building industry capability and developing Victoria's current and future workforce.

The Fellow would particularly like to acknowledge the following individuals who without their support this Fellowship would not be possible.

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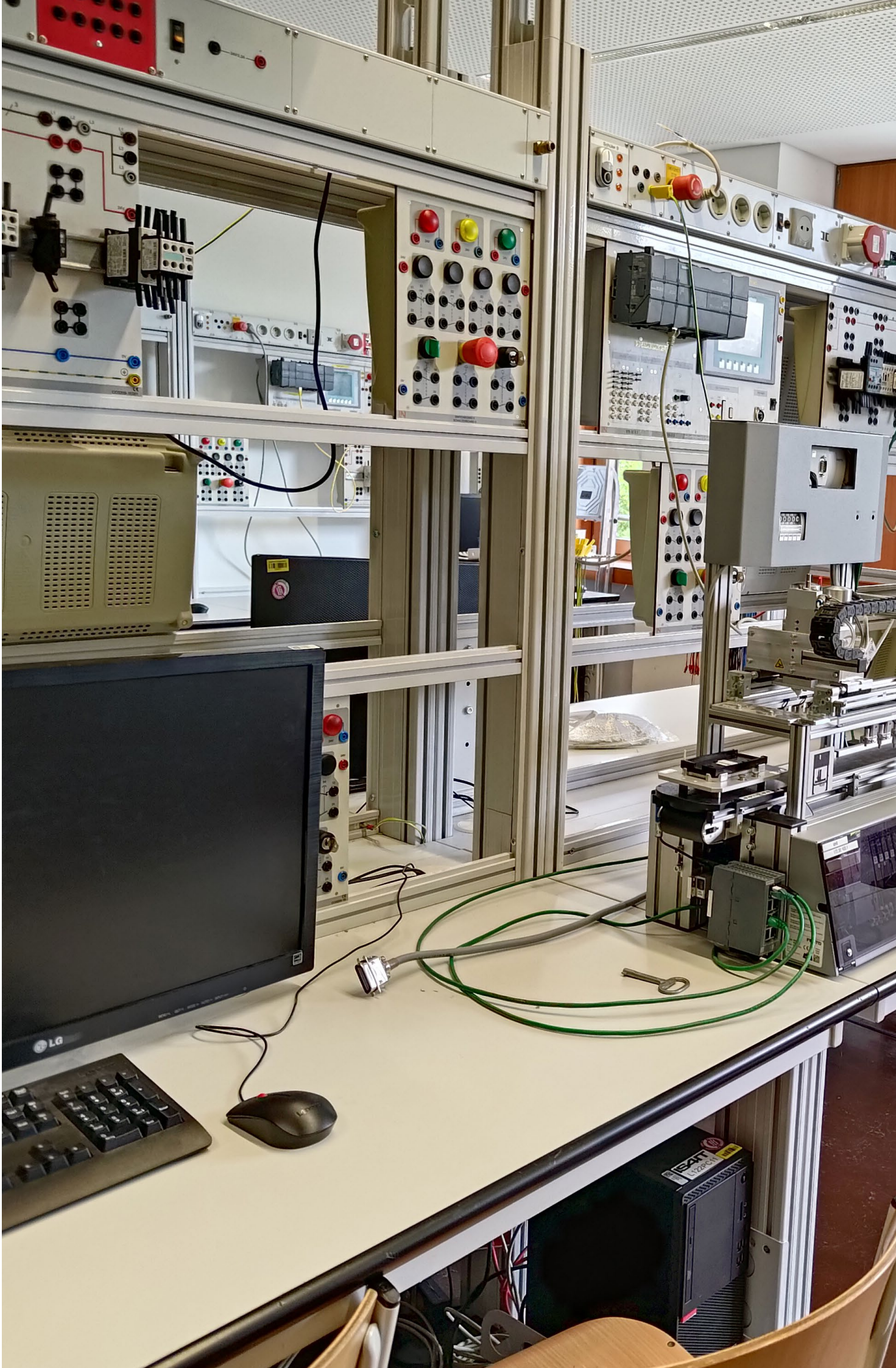
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02
Executive summary

Background

TAFE in Australia is at the crossroads. According to a 2019 report by the National Centre for Vocational Education Research (NCVER), from 2015 to 2019 student numbers decreased by 3.1% to 1.2 million. Funding has been reduced and enrolment numbers have been in decline since 2015. In Victoria, the government has introduced free TAFE for some disciplines to increase student numbers, however this is an artificial increase and does not reflect the national decline.

This downward trend is important to investigate, particularly in terms of a perception of poor employer engagement and of no guarantee of employment outcomes.

This Fellowship research attempts to investigate ways in which VET providers should engage with employers and provide an alternative model to the current one in Australia. Models were observed during the Fellowship period which gave rise to the new ways of thinking. This qualitative Fellowship study utilises applied research from travel to Vietnam, Bavaria Germany, and England during July 2023. This was combined with the attendance at the Journal of Vocational Education (JVET) conference in Oxford, England which gave further insight into vocational education initiatives abroad. The research will outline the German and English model of vocational education and how the demands of employers and the training offered by vocational educations are inextricably linked and propose a contextualised model that could be adapted for the Australian education system. In addition to this applied research a literature review of journal articles published by JVET plus other published papers in the last 5-10 years will provide a backdrop to the engagement of VET with industry in general.

These are problems that will be challenged through this Fellowship. This Fellowship compares the differences between TAFE colleges in Australia and other VET institutions that were visited in Germany and England. The Fellowship illustrates how vocational training is meeting industry requirements in different ways. The Fellowship research is trying to answer the question “Are Australian TAFE providers, offering enough to remain relevant to employers?” Perhaps this is a resounding yes in the basic trades areas such as electrical, plumbing and metalwork however now with the increasing complexity of machinery and automation the Fellow observed much more advanced training options from the Germany model which were tightly integrated into industry.

Fellowship learnings

The major findings of the research are that there does exist, in the Fellow’s view, a better model of industry engagement with the TAFE sector but would require increased cooperation with industry partners. The initial industry partners could be large state or commercial enterprises with the need for highly qualified engineering graduates. This market has declined over the last 20 years with the decline in broad based manufacturing in Australia however

advanced manufacturing (Industry 4.0) such as robotics and mechatronics has made a surge. One report prepared by The Insight Centre estimated that there will be a shortage of 200,000 engineers in Australia by 2040. There are simply not enough people enrolling in engineering degrees to meet the current demand, let alone future needs.

The Insight Centre goes on to say that the large-scale technological and structural transformations required to meet these needs are at considerable risk if action is not taken to address this shortfall in critical skills. The report shows that only 8.5% of students in Australia graduate from engineering programmes compared to 23.2% of students in Germany. King (2021) reports that a substantial percentage of engineering graduates (15%) end up working in non-engineering professions, further demonstrating the lack of graduates entering the engineering workforce. The focus on engineering in Germany was clearly evident during the Fellow's visit to German companies and education providers.

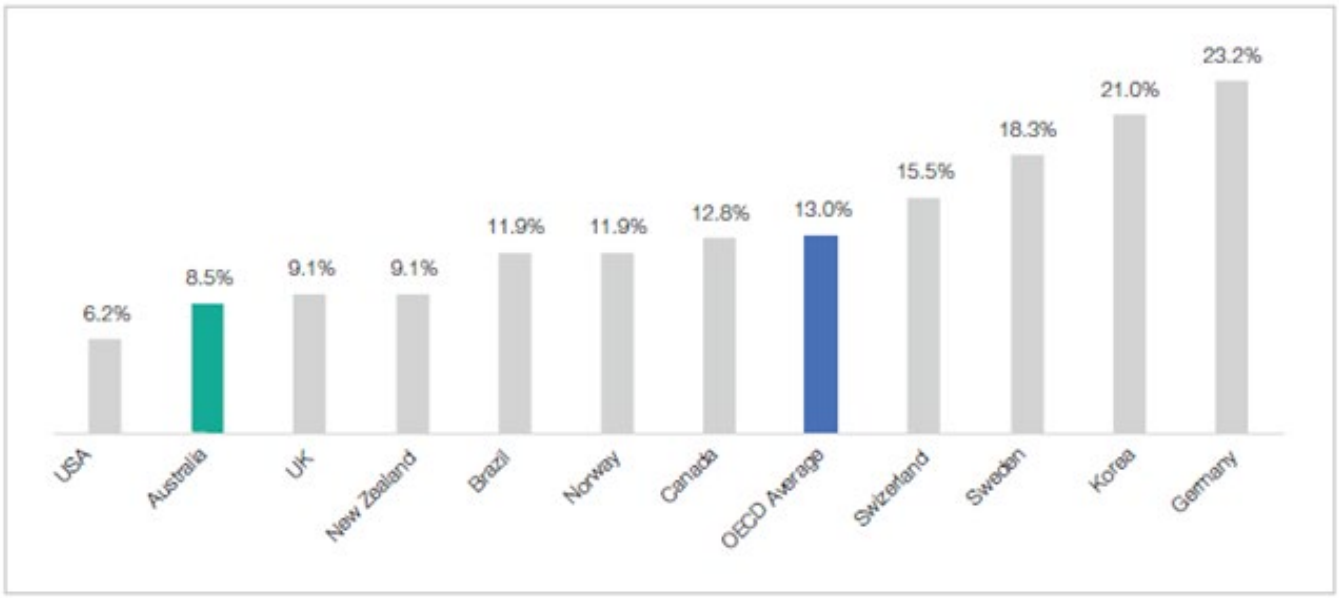

Figure 1. Engineering graduates as a proportion of all graduates in selected OECD countries, 2020 Source: OECD Data (2023) Tertiary Graduates by Field.

It is not proposed to drop in the German or English model into the Australian education system as it has been proven on many occasions that such a “drag and drop” approach does not work from one country to another. What is proposed is a modified Australian model that has come from the Fellowship research.

The Fellow observed both the German and English model of the dual apprenticeship in action whereby students can make a choice to study vocational qualifications from senior high school (final 3 years of secondary education). This of course is similar in Australia with VET in Schools however the key difference is that the English and German model, although slightly different allow for degree apprentices, where the Australian model primarily streams such students in the vocational sector, graduating with either certificate III, IV or diploma level qualifications.

In Australia TAFEs have limited access to Commonwealth Supported Places in engineering degrees which is critical to grow the engineering profession by making it more accessible to students who want to study a more practical oriented degree programme.

The Fellow, from the research undertaken, had 6 learnings and 5 recommendations which are detailed in the findings of this report.


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03
Fellowship Background

Fellowship context

The key aim of this Fellowship was to explore how TAFEs can be more aligned with industry needs and offer specialised education that is practical and meeting employer requirements. The Fellow is interested in Industry 4.0 technologies which is the way companies integrate new technologies into their manufacturing using Internet of Things (IoT) and other such advanced Artificial Intelligence (AI) and robotics into their operations. Many TAFE providers offer bachelor and other higher education products with a more practical orientation than traditional universities however with limited success attracting local domestic students particularly in the Victorian market. There are a variety of reasons for this: mainly owing to the lack of Commonwealth Supported Places; and perhaps equally important, TAFE does not hold the same status as a university. Not only is the education at a perceived lower standard but it is more expensive for domestic students. The table below provides an example for the Bachelor of Engineering (Mechatronics) which is the focus of this Fellowship. Only one TAFE provider in Australia offers such a course however only at Engineering Technologist level rather than Bachelor of Engineering (Honours) level as offered by public universities.

The table below illustrates the differences between a TAFE and a mix of universities for domestic students.

Institution	Chisholm Institute of TAFE	RMIT University	Monash University	Swinburne University	Deakin University
Qualification	Bachelor of Engineering Technology (Mechatronics)	Bachelor of Engineering (Adv Manufacturing & Mechatronics) (Honours)	Bachelor of Robotics and Mechatronics Engineering (Honours)	Bachelor of Engineering (Honours) Mechatronics and Robotics	Bachelor of Engineering (Honours) Mechatronics
ATAR entry 2022	No minimum ATAR requirement	80.3	76.7	75.0	50.0
Cost per year	No CSP offered, $14,840	CSP $8,948	CSP $8,500	CSP $8,301	CSP $7,862
Full time	3 years	4 years	4 years	4 years	4 years

Professional recognition is important for career progression and in Australia the accrediting body is Engineers Australia. The sole TAFE offering (Chisholm) is only accredited at the level of engineering technologist Sydney Accord. All the other university programmes are accredited at the level of professional engineer, Washington Accord. Currently no TAFE provider in Australia has professional engineer accreditation and only very few offer bachelor programmes in engineering. Chisholm is a leader in this space offering a bachelor qualification in mechatronics and this will be further explored.

Fellowship period

The Fellowship was awarded during 2021 however owing to Covid-19 restrictions, travel was only convenient from 2023 to the locations that were chosen. Travel was firstly to Vietnam, then Germany and the United Kingdom. The Fellow chose to travel in July 2023 as it was both a convenient time for contacts abroad, conference attendance plus allowed freedom of movement without mask mandates and other Covid type restrictions.

Fellowship methodology

The approach was to first visit a partner college in Vietnam that offered vocational qualifications to local Vietnamese students. The purpose of this visit was to understand why the Melbourne Polytechnic Advanced Diploma of Mechatronics would be offered to the Vietnamese domestic market. The feedback received was that the perception is that Australia and Germany are leaders in the technology space and by offering an Australian qualification it represents value and status to graduates. Advanced manufacturing is a booming market in Vietnam and the need for highly qualified mechatronics graduates outstrips supply.

The next step was to visit Bavaria Germany and tour 3 public vocational colleges, 1 private training institution plus 2 public listed companies with associated inhouse training centres. These visits focussed on VET training in the advanced manufacturing sector in Germany. Following this visit, the Fellow attended an International Vocational Education (JVET) conference in Oxford, England followed by a visit to Lincoln college in the north of England to better understand the UK model of vocational education. The Fellowship focussed on the education models of Germany and the United Kingdom since the area of interest was in degree apprenticeships in the high-technology mechatronics and robotics field. This model has the potential to reinvigorate Australian TAFEs who could offer degree apprenticeships which is the perfect blend of higher education with the traditional roots of skills-based learning. This model could be important for Victoria but for also for Australia to provide a highly skilled workforce.

The advanced manufacturing industry was chosen because anecdotally there is a perception that what is taught at universities is not practically focussed enough. This field of training needs access to hands on skills such and workshops which are not usually the domain of theoretically based university degrees. In addition, TAFEs are closer aligned with real practical industry needs and produce job ready graduates.

The Fellowship has confirmed a large part of this is true, but it goes further to unpack the reasons why this might be the case and what actions could be taken to ensure that TAFEs can remain relevant by teaching the real skills that are required in the workplace.

The Fellow used content analysis as a flexible method for analysing text data. Hsieh and Shannon (2015) define qualitative content analysis as a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns. There are three different approaches for content analysis according to Hsieh and Shannon (2015), namely conventional, directed and summative. This Fellowship will utilise a conventional approach, which is generally used with a study design whose aim is to describe a phenomenon, in this case the effect of technology, to influence training outcomes. The process is inductive given that data is gathered to build

themes rather than deductively testing hypotheses. This approach is most suited to this Fellowship since it provides a questioning technique which naturally leads to the proposed solutions.

The visits to industry and training organisations in Bavaria Germany provide the primary instruments of data collection and following on from Merriam (2016) using an inductive investigative strategy with the end product being a richly descriptive narrative.

The first visit to the Wacker Chemical Training institute was an example of where a chemical trainee becomes more than just a technician but rather a technician that understands the demands of a highly complex modern chemical plant and able to understand how to operate it and support and develop it for future success. The trainees attend a college adjacent to the chemical plant and time in college is in interlaced with time spent in the plant. The investment in training facilities is outstanding with actual equipment used in the plant available for students to use in the training facilities.

The second visit to a vocational college in Traunsten, provided an example of where there has been success with respect to the industry engagement model in the advanced manufacturing sector. Dual apprentices usually attend both vocational schools (Berufsschulen) and companies for 3–4 years. The apprentices learn generic skills as well as practically oriented competencies with up-to-date equipment. For young German people, dual VET is a common professional path; about half of all German school graduates do not choose a university or polytechnic, but rather a vocational school and these graduates are well represented in the upper-middle income salary bracket (Wiemann J and Fuchs M, 2018).

The next two visits were to manufacturing organisations namely Krones and Siteco. Krones is advanced manufacturing company that makes bottling automation machinery. Siteco is an advanced lighting manufacturer. Both companies have training centres attached to their factories and support apprentices at both degree and diploma level. The apprentices on this occasion attend an external college on block release with the remainder of their time working in the factory and associated training facility which is inside the factory.

These visits were intertwined with two of the supporting vocational schools in Bavaria. It was interesting to note the initiatives taken to ensure skilled employees enter the workforce from the VET system. The teaching staff are fully invested in the student's education and regularly visit the workplace. Likewise, company supervisors often visit the colleges. These practices have led to successes in the industry. What was interesting was the passion of the schools for the industry partners and vice versa and how they work hand in hand to produce the best graduates.

From these Fellowship visits themes were extracted with respect to the training outcomes for the students. The inductive approach to qualitative research led to these themes emerging. As Merriam (2016) points out the inductive process is to gather data to build concepts, hypotheses, or theories rather than deductively testing hypotheses as in positivist research. The Fellowship methodology was to try and ask probing questions to get a grasp of the underlying reasons why such an education model works and benefits employers.

Fellow biography

Leonard Spain has worked in the education sector in both higher education as well as Vocational Education and Training (VET). Leonard has largely worked in transnational education from teaching information technology, programme management and leadership and development of training programmes. Leonard has adapted Australian VET programmes for international markets and understands the nuances of what is required to make Australian programmes successful offshore. Most importantly Leonard is passionate about how industry can influence VET programmes and how they can be tailored to suit the needs of learners and industry alike.

Since 2015, Leonard has been involved in leadership and development of VET and higher education programmes offshore. In his present role of Director, International Academic Operations with Melbourne Polytechnic, Leonard manages the academic programmes of institutions offshore that run Australian qualifications. Leonard not only manages the academic programmes but also leads the contextualisation of resources to meet the specific needs of offshore operations.

Previously Leonard held senior information technology executive roles in some of Australia's largest organisations such as Telstra, Ford, Ambulance Victoria, Skilled Engineering and Toll. These skills ensure that Leonard has an ability to implement highly complex business models and lead led large programmes of work across organisational boundaries for thousands of staff. His passion and knowledge of the high technology industry is second to none.

Leonard holds a Bachelor or Engineering (Electrical), UTS plus a MBA of Technology Management, Deakin. Leonard also has completed a Graduate Certificate of Australian Migration Law, ANU and a Graduate Certificate of Adult, Vocational Education and Training, Deakin.

Abbreviations / Acronyms / Definitions

VET	Vocational Education and Training
TAFE	Technical and Further Education
MBA	Master of Business Administration
CSP	Commonwealth Supported Place
EFTSL	Equivalent Full Time Study Load
CSP	Commonwealth Support Place
ATAR	Australian Tertiary Admission Rank
AAIS	Australian Apprenticeship Incentive System
TEQSA	Tertiary Education Quality and Standards Agency
ASQA	Australian Skills Quality Authority

04

Fellowship Learnings and Findings

In Australia VET training and assessment is strictly controlled via the training packages and as a result very restrictive and normalised as to what is taught. Arguably this is a good thing as it ensures that graduates are trained equally and meet the standards set by the regulatory body, the Australian Skills Quality Authority (ASQA). Essentially it is meant to reflect industry led training and dictate what should be included and how it should be measured. The question that needs to be answered is, is this good enough to meet the demands of industry. Are Australian Qualification Framework (AQF) training packages, which are developed to a prescriptive formula, good enough to meet the ever-changing technological demands of industry? Is there enough agility amongst state government TAFE colleges to design courses to the specific needs of an employer or industry?

Pacher et al, (2023) asks the question as to what extent modern vocational education and training must change and adapt to prepare students for the labour market when the future is not yet known. They further go on to say that the acquisition of competence must always be considered in connection with the underlying goals and purposes.

As the European Centre for the Development of Vocational Training (CEDEFOP) points out the Germany dual VET system is organized around a significant front-end investment for young learners which has contributed to the underdevelopment of training for adults. Nevertheless the specific setup of two learning environments, in a commercial firm and a vocational school, working in symbiotic fashion ensures that well trained work ready graduates are the result.

The German system utilises equipment as used in factories as many training centres themselves are located on factory floors or vocational schools emulating work places. The Australian system may be adequate but where it falls way behind the German system is in the cooperation with industry. In the German system the vocational school system works closely with all employers who are inextricably linked to the training programmes.

During this Fellowship it was observed the VET institutions visited abroad only had high school leavers as students. To avoid a negative perception of vocational education as a dead-end option, transition to further education was supported. Students could choose a diploma(trade) level qualification or alternatively do a degree apprenticeship. The skills in the workforce are the same however the student would attend a university over 5 years instead of 31/2 years at the vocational school. The German model of training commencing in secondary schools is a great model. The schools that were visited are a great testament to this model, mostly providing training for students in high tech profession with graduates leaving with the equivalent of a diploma or a bachelor degree as part of the German dual education model. (Appendix 1). Lichtenberger (2018) suggests that in Germany the model has always been highly valued as a route to skilled and high-status employment, without the stigma that has been associated with the model in other

countries. This German dual education system allows for students to gain real practical on the job training plus attend school full time and directly apply what they learn to the workforce. Students are allowed block release to attend school and spend the other time on the factory floor applying their newly learned skills.

The Fellow's visit to Bavaria, Germany took in a number of these vocational training schools plus the training centres located within factories in the high-tech industries. Krones (krones.com) was one such company which provides solutions for the beverage industry by building the complex machinery for bottling, processing, filling, packaging and IT solutions to the organisations that produce beverages. The scale and sophistication of this factory was very impressive but what was of most interest was their investment in training of apprentices and how they were integrated into the workforce. Krones was one of a number of companies visited that had their own training organisation and staffing solely dedicated to the training of apprentices. This area, on the factory floor, complete with equipment and staff was to provide a training environment for apprentices to learn in an environment that was not detached from the real-world operations. In another example of Wacker Chemicals (wacker.com), an international chemical company, has a purpose built training centre adjacent to the chemical factory. Students can work alongside their qualified workers and spend time both in the factory and the training centre. It is a fully privately funded college with facilities that are second to none and appeared to be better equipped than privately funded colleges with equipment and models that come directly from the factory.

The third organisation Siteco (www.siteco.com) had a very similar profile but their advanced manufacturing was highly sophisticated. Qualified engineers and engineering students work alongside each other to build complex machinery for the lighting industry. These engineering students particularly, in years 4-6, are basically treated as engineers within the plant. In talking to a few of these students, it was noted that they commit to these jobs for life and value the opportunity to learn on the job and be educated at the same time.

The themes appearing from the research demonstrate the clear linkages between, investment in technology at training institutions, employer engagement and industrial relations as key drivers of success for enhanced learner outcomes. Even from a limited view of several companies and education providers in southern Germany key themes emerged which is a mix of things done well and not so well. Regardless of whether the above are done well or not, what is clear is that they are the key drivers to success. The education conference attended in Oxford, England further amplified this knowledge with many researchers from across the globe presented on advanced manufacturing vocational education and linkages with industry.

The social context underpinning vocational education in Australia is well behind what was witnessed in Europe. In Australia, a broad consensus does not exist between governments, employer peak bodies, unions (including teacher education unions), educational institutions and the welfare sector about the purpose of vocational education, or its role in Australian society more broadly (Wheelahan et al. 2018). This is borne out by the fact that VET, and particularly TAFE education, is based on very narrow and specific unit of competencies as required by the training package rules rather than a broader education paradigm that prepares graduates for jobs in their respective industry sectors. Firstly competency-based training (CBT) has resulted in a system that does not meet the needs of industry nor students. According to NCVER data, only 56.0% of VET students who completed their qualifications improved their employment status after training. NCVER (2021). Secondly CBT neither meets the needs of industry to be recognised as skills that assist graduates which provides less incentive to participate in such training.

To be fair, Australian TAFEs do work with local industries to develop programmes to meet the gaps in the workforce. This requires TAFEs to work with industry partners to develop programmes that meet their needs. However as noted by Wheelahan (2018) funding cutbacks have devastated TAFE's ability to undertake this kind of work. Rebuilding the capability of TAFE to undertake bespoke curriculum development not just canned training packages is something that needs to be funded to ensure this can occur. TAFE institutions, like universities, would need to be self-accredited which allows for flexibility of course development not just offer training package qualifications. Courses could then be developed to meet the requirements of employers and local industries that are specifically relevant to industry needs. Wheelahan (2018) further comments there are bad qualifications based on bad models of curriculum that result in rigid, one size fits all qualifications for all Australia. We need qualifications that put the needs of the employer first which is why many private training providers, which offer industry certifications and micro-credentials rather than training packages, are surviving in the contestable market.

Industry engagement is critical to the development develop of human resources for future manpower requirements. What was observed in Germany was that VET teachers in many instances are part of companies and also work on the factory floor. The ones that work in schools can also be assigned part time to industry. This does not happen in Australia for several reasons. Usually in the Australian TAFE sector, teachers are ongoing full time and once in the system are unlikely to be employed in industry. Likewise industry experts do not have the time to teach nor wish to study the teaching qualification, namely a Certificate IV in Training and Assessment (TAE) or higher in order to be permitted to teach in the Australian VET sector. These are barriers to success. In Germany to be a trainer in a company-based VET provider only a 2-week teacher training course is required. Whilst this may be at the other end of the scale to a TAE , it nevertheless removes this barrier.

According to the Australian regulatory framework, as outlined in the standards, VET teachers must have been employed in a prior occupation before becoming a VET teacher, thereby becoming 'dual professionals' with a requirement to develop and maintain both industry and educational skills. Though experts in their industry discipline, beginning VET teachers are most often novices to teaching and potentially unaware of the depth and breadth of knowledge required to transition from industry expert to VET teacher, or even that such a transition is required. (Schmidt 2019).

Following the visit to England and Lincoln College, Lincolnshire, the Fellow was able to understand more about the English degree apprenticeship model as opposed to the German model. Employers work closely with education providers to design and deliver the apprenticeship curriculum. Degree apprenticeships are widely used in England and are well adopted by industry.

In the UK the model observed is as follows. It sits within a well-established tradition as a mode of learning at university combined with work-integrated-learning (WIL) which is recognised as part of education. It has been jointly designed by universities and polytechnics where employees are offered a degree or vocational pathway. The industries are varied however it is mainly focussed on business degrees as shown by the table below. Engineering and manufacturing technologies which is the focus of this paper, which was observed at Lincoln College, represents approximately 5% of all degree apprenticeships offered in the UK.

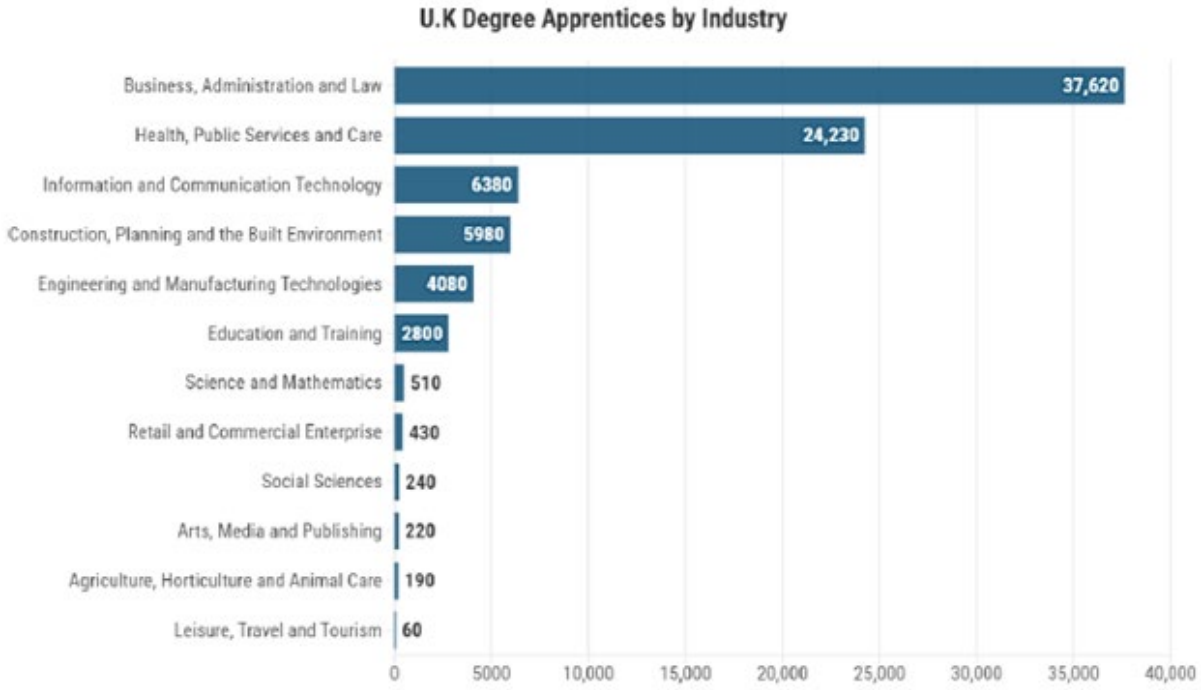


Figure 2. Source Ai Group report

In the UK apprenticeships are supported by government policy where a 0.5% levy is deducted from employers with an annual payroll over 3 million pounds. This levy goes to an account which can be used to fund apprentices and is not refundable or able to be used on anything else. This is a large incentive whereas in Australia no such a government policy is not in place to encourage companies to take on apprentices. The Fellow from his observations in Germany, followed by looking at the UK model and talking to other VET researchers has devised a model as outlined below that should serve the Australian landscape well.

Proposed Model

The proposal is to offer in Australia a degree apprenticeship similar to the English model. This apprentice could be called a “cadet” to differentiate from a skilled tradesperson. The proposal for a cadet would be to study an engineering degree part time while working and studying at TAFE. The Fellow saw the opportunity to develop a model loosely based on the German and English models but would work in Australia. This is different to the dual system offer ing a degree apprenticeship in Germany or the degree apprentice in England as it would be taught in the TAFE system yet be fully accredited as a higher education degree.

The proposed model as outlined in the table below, shows how apprentices, hereinafter called cadets, would take full semester of paid study during the middle semester of each school year. This is typically 12 weeks plus mid-semester breaks, study week and exams. Apart from this 13–15-week period, the cadet engineer would be expected to work in a sponsored company full time. During the work semester, the cadet would be released to study full time however would still draw his/her full salary. The model is equivalent to a 4-year full time, professionally accredited, Bachelor of Engineering programme that requires 8.0 EFTSL delivered over 6 years part time instead of 4 years full time. Note the model front loads the study slightly with the last two years show ing a slight reduction in student study load nearing graduation. This is an ideal fit for TAFE colleges that offer higher education undergraduate qualifications and are less restrictive that than the training packages governed by ASQA. The Fellow sees these as a perfect fit for the cadet utilising a practical TAFE based organisation delivering a part time higher education qualification interlaced with work and study. The employer also benefits from this by offering a training salary, subsidised by government and has an employee for the full year apart from 15 weeks of block release study plus annual leave entitlements.

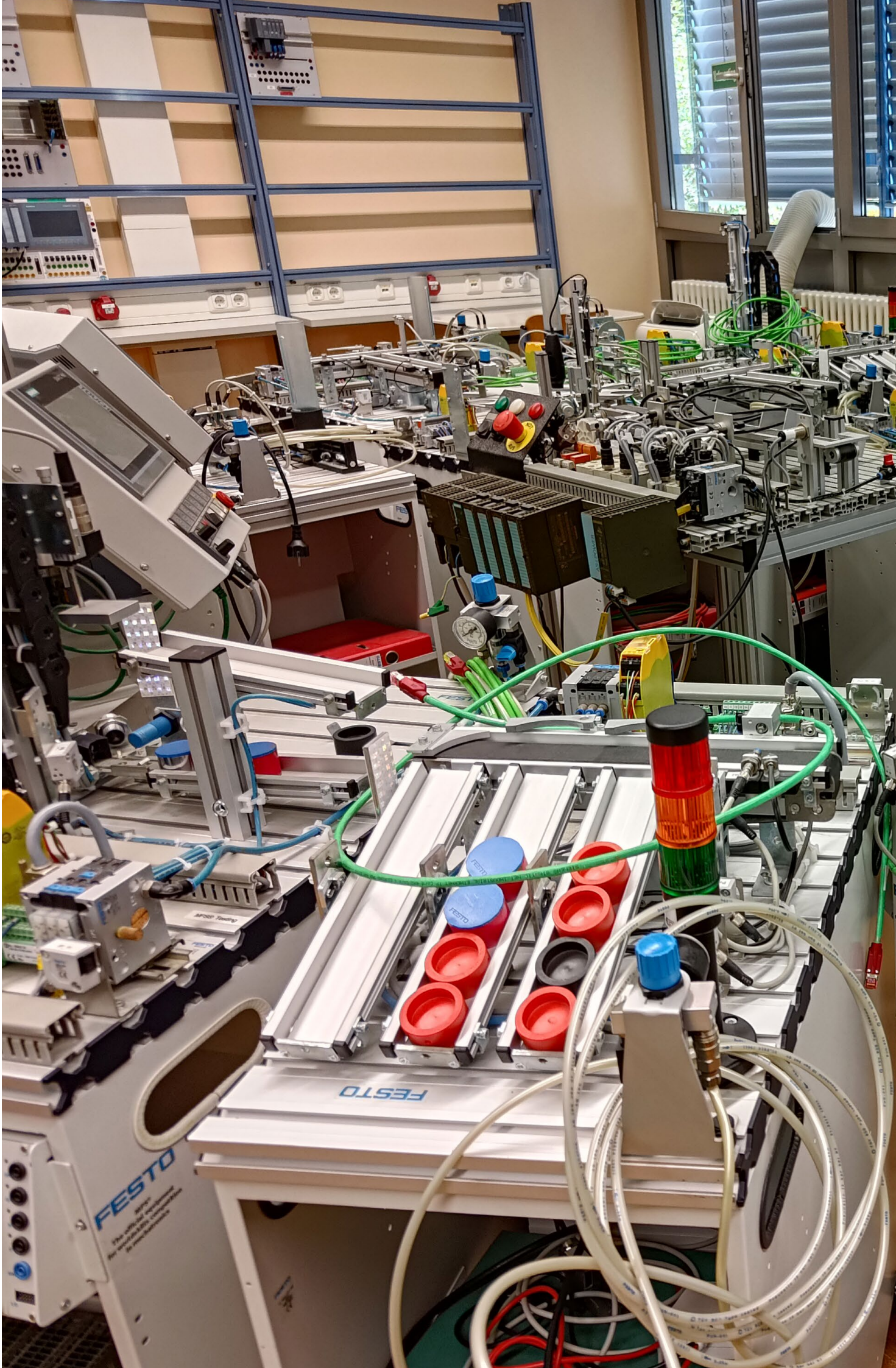
Year 1	Semester 1	Work full time, study part time evening, 0.125 EFTSL
Year 1	Semester 2	Study full time, 1.0 EFTSL
Year 1	Semester 3	Work full time, study part time evening, 0.25 EFTSL
Year 2	Semester 1	Work full time, study part time evening, 0.125 EFTSL
Year 2	Semester 2	Study full time, 1.0 EFTSL
Year 2	Semester 3	Work full time, study part time evening, 0.25 EFTSL
Year 3	Semester 1	Work full time, study part time evening, 0.125 EFTSL
Year 3	Semester 2	Study full time, 1.0 EFTSL
Year 3	Semester 3	Work full time, study part time evening, 0.25 EFTSL
Year 4	Semester 1	Work full time, study part time evening, 0.125 EFTSL
Year 4	Semester 2	Study full time, 1.0 EFTSL

Year 4	Semester 3	Work full time, study part time evening, 0.25 EFTSL
Year 5	Semester 1	Work full time, study part time evening, 0.125 EFTSL
Year 5	Semester 2	Study full time, 1.0 EFTSL
Year 5	Semester 3	Work full time, study part time evening, 0.125 EFTSL
Year 6	Semester 1	Work full time, study part time evening, 0.125 EFTSL
Year 6	Semester 2	Study full time, 1.0 EFTSL
Year 6	Semester 3	Work full time, study part time evening, 0.125 EFTSL

A proposed salary equivalent is shown below. Basically the cadet would only be paid 45% of an graduate engineers salary in their first year. This also considers that the cadet is at school full time for 13-15 weeks in the middle semester although is a full-time employee drawing a normal salary and benefits, with leave accruing during this time. The Manufacturing and Associated Industries and Occupations Award 2020 published by the Fair Work Commission allows for a trainee engineer at a minimum of 62% of C6 level at 18 years or age. This would roughly fall in line with the salary rates below noting a graduate engineering salary in a competitive industry would be approximately $81,000 per annum.

Year	**Percentage of graduate engineer's salary**
Year 1	45%
Year 2	55%
Year 3	65%
Year 4	75%
Year 5	85%
Year 6	95%
First year after degree completion	110%

The cadet would then on completion of 6 years of study would be offered the second increment of a graduate engineer or 10% more than a graduate engineer would be offered to acknowledge prior experience in the company. A wage subsidy, similar to the Australian Apprenticeships Incentive System (AAIS) to be offered to cadets is something the Fellow sees as a key additional implementation component and would lobby government to achieve this.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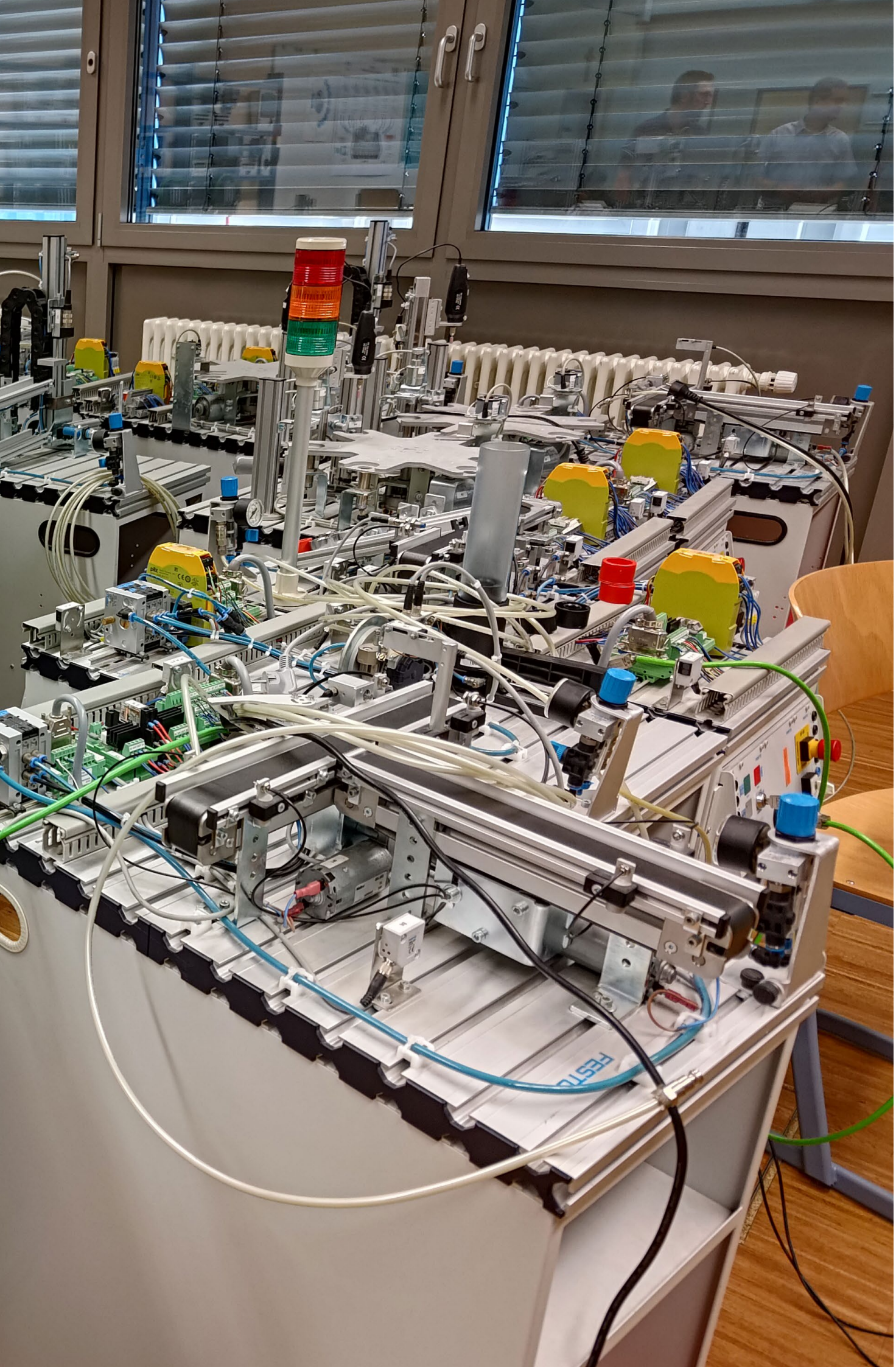

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Considerations and Next Steps

The Fellow firmly believes that this Cadetship is an important opportunity to revive the TAFE sector and provide industry in the advanced manufacturing industry an ability to recruit highly skilled work ready graduates. The proposed launch pad for this future work is to find 3-4 large employers and 1-2 TAFEs that are willing to jointly cooperate to launch such a programme. The programme would need the support of many bodies to go to market.

The approach to have this recognised would be to modify the Bachelor of Engineering to be delivered over 6 years. The trimester delivery model would need to be adopted by the TAFE provider. This would make the Engineering degree achievable with a mix of study and work. In some Australian universities the 3rd semester of approximately 18 weeks is down time in the academic context and could be filled with work experience as proposed. The Fellow believes only TAFEs have such flexibility with their delivery model where universities have very structured engineering honours programmes.

The challenge here is to have this new programme adopted and accredited by TEQSA and Engineers Australia under full professional status. TAFE organisations are usually not self-accrediting like universities so would need to demonstrate that such a course has the academic rigour and clear learning outcomes to satisfy TEQSA requirements.

The target for this pilot is TAFE providers who have experience in higher education and already have programmes registered with TEQSA.

The challenges to such an implementation is to achieve alignment between government, education providers and industry. This exciting initiative could be launched in first semester 2025. Ideally the Department of Education would provide Commonwealth Supported Places to lessen the impact on the student. Without it the programme may be less attractive to students however may still be a viable option. Wage subsidies for employers via Apprenticeships Australia is regarded as more important for cadets which would most likely attract industry sponsors.

It is suggested that this pilot programme is first trialled in Victoria as the Fellow has connections with the local market. Canvassing of suitable industry partners would be necessary to gain funding. Limitation of this programme are that at first it would be for a select few and may be seen as elitism. This is not the intention but rather it could be expanded to a broad range of technology industries particularly across the engineering sector where skilled graduates with hands-on experience are in short supply.

The cadetship is the ideal model for industry, TAFE providers and potential cadets who would all benefit. Firstly, cadets would be paid a full-time salary to both work and study whilst obtaining a degree in a much-needed skill area of mechatronics engineering. Secondly employers would fill the requirements of ready skilled engineers in the workplace. Actually, cadets in their final two years would be able to take on work and be as productive, if not more so, than fresh

graduates from a full-time university programme. Thirdly TAFE colleges could gain additional income from new students and deliver courses that are more aligned with their core strengths of practical based education and training.


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06
Impacts of the Fellowship

Personally

- The Fellow had a very transactional view of the TAFE education market. What this means is that he simply saw it as a means to an end for many students, namely to get a qualification, leave and find employment.
- The Fellow now sees TAFE as offering much more, offering people an opportunity to change their lives thorough skills development. These skills can be learnt by either school leavers or mature adults.
- The Fellow's eyes were opened to vocational education delivered abroad not only in Australia. This has renewed energy and passion toward vocational education and training and ways it can have a much broader impact on the community.

Professionally

- The Fellowship was professionally enlightening. As a leader for Melbourne Polytechnic across our international delivery space the Fellowship has provided a broader perspective to devise new solutions for the transnational marketplace.
- This Fellowship has opened one's mind to a totally new model that will revolutionise the Australia industry. Getting such a project off the ground could change the whole role that TAFEs could play in the education market in Australia.
- The idea for this degree apprenticeship or cadetship was born out of the Fellowship visits and further research. Without such a Fellowship this broader thinking would not have resulted.

Organisationally

- The Fellow has made changes within his control in respect to the findings of the research. The Fellow has had discussions with international partner institutions to look at how they engage with industry to influence what is taught in the classroom.
- The Fellow used the research findings to normalise the way that delivery is undertaken with transnational education. By gaining access to institutions that we don't normally work with and see how they also work with other organisations has provided ideas on implementing repeatable programmes for transnational TAFE education.
- The learnings from this research and the resulting project has the ability to provide Melbourne Polytechnic an opportunity to be a visionary leader in Australian education.

Broader VET Sector

- For the broader VET sector, this represents a great opportunity to open new markets and funding. Firstly the technical field is growing and the Professionals Australia model predicts a skills shortage of 200,000 engineers by 2040.

- This huge shortage of qualified workers has triggered a need to find better ways of training highly qualified engineers in Industry 4.0 skills to ensure Australia remains at the forefront of a technological powerhouse.
- This Fellowship if successful will impact the sector in a big way. TAFEs will no longer be irrelevant for advanced education and not simply seen as the weaker cousin of the education tree simply training tradespeople and technicians.
- The impact of this Fellowship will be felt across the nation if successful. Naturally many government and industry bodies need to get on board however this Fellow is confident he has the skills to lead a project of this scale.


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Sector Engagement (Dissemination)

The Fellow is actively seeking further opportunities to engage with key stakeholders to progress this cadetship proposal.

To take the research proposal to the next step would be to create a centre of excellence and build a pilot programme for the initiative. In order to do this firstly the proposal would be presented to the Victorian Skills Authority (VSA). Reviewing the VSA Victorian Skills Plan for 2023 into 2024 it is noted that access to higher education funding for TAFE network providers exists and the Fellow would explore how to access such funding. Further engagement with the VSA with respect to the apprenticeships innovation fund and higher apprenticeships pilots. It is recommended that VSA provide funding for TAFEs to further develop academic programmes for cadetships.

The dissemination plan would commence with a walkthrough with VSA on the proposal and what would be some of the key outcomes namely:

- Support from a number of key industry stakeholders such as defence who would provide jobs to cadets. Have already discussed with the Ai Group and they have offered a roundtable with employers once the pilot project has been scoped.
- Apply to DEWR (Australian Government) for funding for a centre of excellence. Likewise apply to the department of Commonwealth supported places for higher education studies at TAFE plus wage subsidies to employers for cadets.
- Treasury's Working Future white paper discusses the development of 'higher apprenticeships'- which combine structured on-the-job training through apprenticeships with study leading to degree-level qualifications.
- Partner with a TAFE for a pilot programme. Could leverage of Melbourne Polytechnic's Advanced Manufacturing Centre of Excellence (AMCOE) with the Advanced Diploma of Mechatronics or Chisholm's Bachelor of Mechatronics as a base. Both of these would need to be developed with modified delivery models and content review.
- Engage with TEQSA for course registration with new programme and delivery model.
- Examine the university models of bachelor of mechatronics to compare course content to see how such a course could be adapted to the TAFE model. Particularly focus on Industry 4.0 concepts. Deakin and Swinburne have excellent examples of Mechatronics Engineering.
- Social research with the Office of TAFE Coordination to see if there could be a cooperative model which would benefit the state of Victoria rather than just one TAFE.
- Engage with Engineers Australia to ensure any course would be able to achieve full professional recognition status.
- Have the research published more broadly through groups such as AVETRA to gather momentum for the initiative.

In the Australian Universities Accord – Interim Report 2023, it is reported the degree apprenticeships are currently being explored with TAFE across Australia. It references a programme between Flinders University in partnership with BAE systems to develop a Diploma of Digital Technologies to support the ship building workforce for Defence projects in South Australia. This is different to the cadetship model as it is a university offering a vocational qualification to adults who have been in the workforce for many years. The exploration of how this in terms of delivery model and learning outcomes would be useful to design the new cadetship model.

In all states except South Australia VET apprenticeship are underpinned by National Training Contract and industrial relations projections and can only be delivered by VET providers. South Australia is the only state that has enacted legislation that enables apprenticeships and traineeships to be available at the higher education level. There is no such provision in other states. The consequence of this is that a degree-level apprentice in states other than South Australia are not able to sign a government-approved training contract, and do not fall under the protection of STA inspectors.

The Fellow believes this cadetship proposal timing is perfect. The South Australian Skills Commission has formally declared the Bachelor of Software Engineering (Honours) as a trade under the South Australian Skills Act 2008. Companies can now engage in formal training contracts with apprentices who will complete a degree over five years while will working as an employee. This has jointly been developed between the Ai Group, BAE Systems and the University of South Australia.

The Fellow proposes a similar cadetship style model as articulated in this report could be launched as a pilot in Victoria. With similar support from the Ai Group the Fellow would hold a roundtable with employers and TAFE colleges to go through the detail of the proposal which is similar but different to the South Australian model. The pilot programme in Victoria could attract cadets from around Australia. The employer could have operations based in Victoria but may not necessarily be headquartered in Victoria.


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Conclusion

The learnings and recommendations are as per the following table.

Learnings

Learning Number	Outcome
Learning 1	Publicly funded offshore vocational education providers face the same challenges that they do in Australia with respect to limited funding.
Learning 2	Private industry backed training organisations offshore are extremely well resourced and funded and offer a more expansive education than large publicly funded institutions.
Learning 3	Vocational Education and Training (VET) is seen in Germany as high status credentials and “Master Craftsman” can earn salaries in excess of their degree counterparts.
Learning 4	The concept of a degree apprentice as per the UK model is something that could be modified and adopted in Australia.
Learning 5	TAFEs in Australia should offer a differentiated higher education product and not try and copy university type education.
Learning 6	The Australian post-secondary education model should be reviewed to meet the growing demands of an increasingly complex high technology sector with changes implemented in the education model to produce Industry 4.0 ready and trained graduates.

Recommendations

Recommendation Number	Action
Recommendation 1	Victoria should take the lead with a pilot cadetship programme in Industry 4.0. The Bachelor of Engineering Mechatronics degree could be developed and accredited by TAFE and partner with industry to deliver.
Recommendation 2	TAFEs should offer the Bachelor of Engineering (Honours) over 6 years part time instead of 4 years full time. This would include mixture of full time and part time study to allow cadets to work in industry.
Recommendation 3	Major employers to work with TAFE providers that who can provide a higher education delivered over a trimester model to provide an apprenticed based employment linked to academic outcomes. One full time semester interlaced with 2 part time semesters (evening classes).
Recommendation 4	Work with the Department of Education, TEQSA and Engineers Australia to develop course learning outcomes for accreditation for TAFE delivery.
Recommendation 5	Lobby industry groups to launch a cadetship programmes firstly in Victoria as a pilot scheme before rolling out across Australia.

There is an opportunity for incredible growth in the TAFE and further education sector through the implementation of these specific higher education programmes. TAFE needs a point of difference rather than simply emulating the University model of degree programmes. TAFE should compete by offering a unique product that will attract domestic students. The cadetship could be the saviour for TAFE to offer higher education to domestic cohorts. TAFEs by not capturing this market, are not utilising the skills they are renown for, namely practical education. Prior to 1990 Australia had Colleges of Advanced Education and Institutes of Technology that offered degrees but were ranked above TAFEs but below universities. Following the Dawkins review in 1989 these colleges ceased to exist. The Fellow is proposing a similar style of education that was once offered by these institutions which is now lost but can be offered by the “new” TAFE institutions foray into higher education.

Many of the innovations highlighted in this report point to the need for governments, industry and TAFE providers to find new ways to cooperate. With the proposal for a new technically focussed higher education qualification delivery by TAFE has significant benefits for students and industry alike. The cadetship scheme opens up education opportunities for students in growth sectors that are not easily at reach. The notion that students can earn money whilst learning on and off the job provides an affordable pathway which will modernise and transform employer engagement with TAFE and will set the new standard for Vocational Education and Training.


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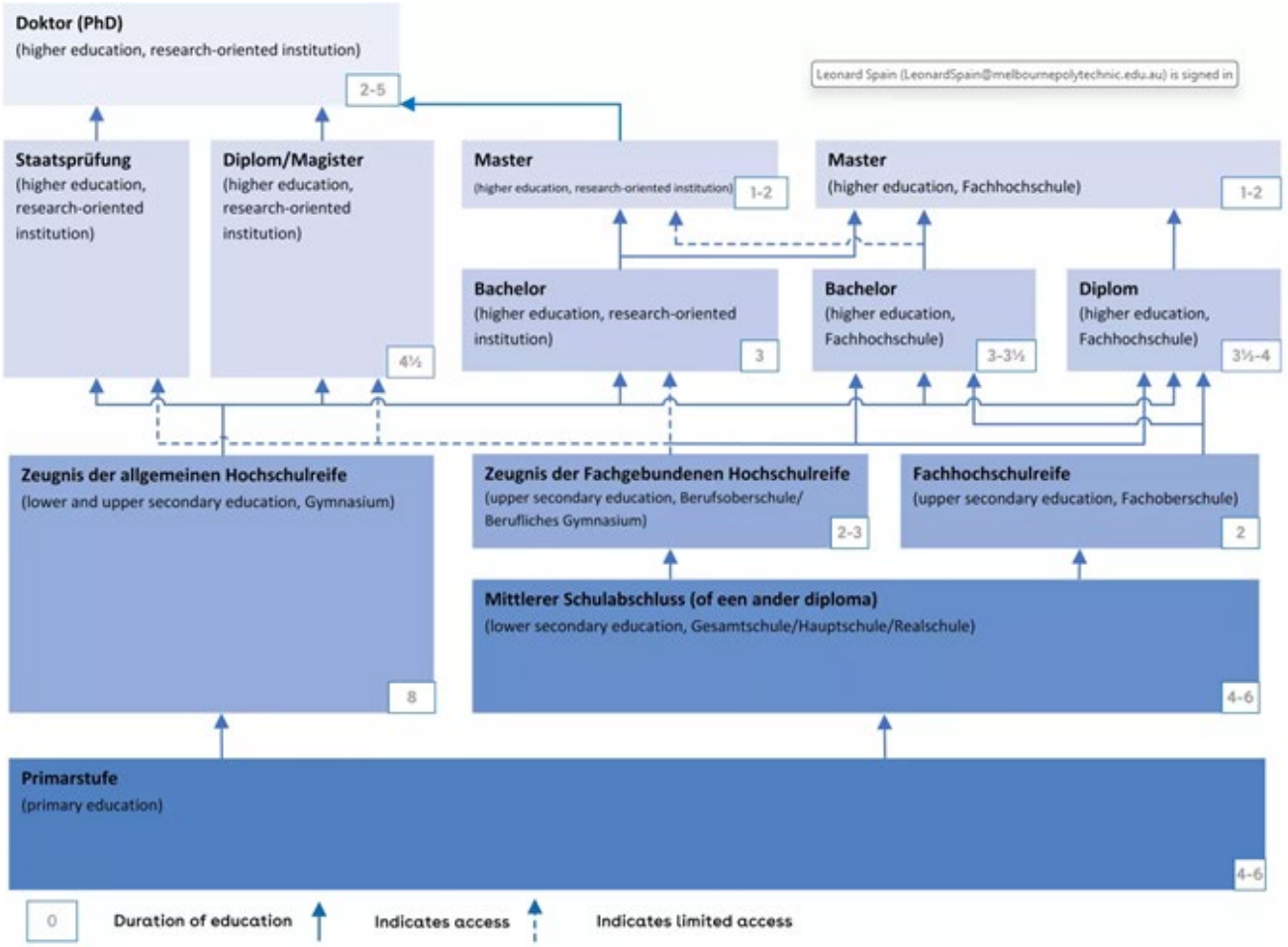
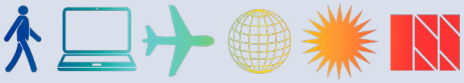
10 Appendices

Appendix 1:



German Education Model, Source: Nufflic 2023



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