

Can a Full Semester of WIL Satisfy Students, Industry and the Accrediting Body Alike?

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ABSTRACT

CONTEXT

An authentic industry experience through an immersive 5-month full-time Work Integrated Learning (WIL) placement is an innovative point of difference for all STEM degrees at Flinders University. Providing undergraduate engineering students with a semester-long placement means they work on substantial projects, understand company culture, and develop employability skills that facilitate assimilation into the workplace upon graduation, while a student under supervision.

PURPOSE OR GOAL

Engineers Australia (EA) requires all students at the Professional engineer level to undertake 12 weeks of engagement with professional practice (EPP) during their undergraduate studies. The goal of this study was to assess the performance of the Flinders WIL model as it differs in both length and programmatic structure to other universities. Parameters assessed include student satisfaction and employability as well as industry satisfaction and engagement.

APPROACH OR METHODOLOGY/METHODS

The Flinders placement typically occurs in semester 6 of 8 (the second half of third year), where the prior semester delivers mandatory workplace preparation material. Surveys are conducted throughout both semesters to monitor the effectiveness of the program. A comprehensive Workplace Preparation topic includes intellectual property counselling, professionalism within the workplace, workplace health and safety, project management, skills related to CV preparation and interviews, and industry networking evenings. Post-WIL placement, both industry hosts and students are surveyed to ascertain satisfaction levels and areas for improvement.

ACTUAL OR ANTICIPATED OUTCOMES

Recent national statistics indicate that Flinders graduates attain employability above state and national averages. Aggregated survey data from the last four years revealed most students agreed they received a good level of support during their WIL placement (88%, n=309) and felt better prepared for graduate employment (92%, n=331). Post-placement, 73% (n=326) of students received some offer of employment from their host company. Industry engagement for the Flinders program is also very strong, with 96% (n=194) of industry partners confirming an interest in hosting future students. Additionally, based on the experience they had with their WIL student(s), 97% (n=194) would hire a Flinders graduate if a position were available.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

The unique Flinders WIL placement model benefits both industry and students. It achieves employability levels above state and national averages and almost all industry partners are satisfied with the experience. This results in further engagement such as offering casual work over the summer, graduate employment, or an industry sponsored Honours projects in Year 4.

KEYWORDS

Work Integrated Learning, employability, industry.

Background

Engineering education at the tertiary level in Australia is overseen by Engineers Australia (EA), the peak professional body for the profession. Founded in 1919, EA's evaluation and accreditation process ensures that Australian engineering graduates meet current international benchmarks related to practising engineering (Engineers Australia, 2023). Expert independent panels assess engineering programs on a cyclical basis, with EA being a full signatory to the Washington Accord at the Professional engineer level through the International Engineering Alliance (International Engineering Alliance, 2023).

Engineering programs are assessed by EA Accreditation Panels composed of academic and industry representatives that form sub-panels with specific discipline or domain expertise. The Panel assesses a given program across a number of areas called Academic Programs or APs. Academic Program 4 (AP4) specifically relates to engagement with professional practice (EPP), where assessors evaluate how a given program initiates:

"...the development of sound professional work practices and methods that underpin reliable professional judgement and decision-making, and to embed these work practices and methods so that they continue beyond the education program" (Accreditation Criteria User Guide – Higher Education, 2023, pg. 17).

The Accreditation framework provides several opportunities for tertiary institutions to meet their EPP obligations to engineering students, including simulated, virtual or industry environments that are *"materially different from the usual education environment"* (pg. 17). Further, EA recommends that EPP is *"nominally the equivalent of 60 days (12 weeks) at the Professional Engineer level"* (pg. 18-19). Mindful of this EPP requirement, a common program of study for Australian engineering degrees requires students to undertake their EPP over the summer holidays between third and fourth year of study. In many instances the EPP component is a compulsory requirement but contributes zero units towards the program of study for the degree.

Work Integrated Learning or WIL is typically how tertiary institutions meet EA's EPP requirement. WIL is an umbrella term with many different definitions, defined recently in the *International Journal of Work-Integrated Learning* by Zegwaard *et al.*, as:

"...an educational approach involving three parties – the student, educational institution, and an external stakeholder – consisting of authentic work-focused experiences as an intentional component of the curriculum. Students learn through active engagement in purposeful work tasks, which enable the integration of theory with meaningful practice that is relevant to the students' discipline of study and/or professional development" (2023, pg. 38).

At Flinders University, WIL is viewed as a fundamental element of all engineering degrees and is recognised as making a significant contribution to the transition of our graduates into the workplace. An authentic, purposeful, and structured WIL placement is beneficial to students and industry alike and is critical in facilitating innovation, enabling students to apply their classroom learning to real-world problems and gain industry-relevant skills, thereby boosting their employability (Dressler and Keeling 2004, Billett, 2011). The WIL program at Flinders University embeds students with an industry partner for a whole semester (5 months or 20 weeks) significantly longer than the nominal 12 weeks suggested by EA. This unique and immersive experience means students are provided with an opportunity to work on a substantial project or projects, develop deep relationships with their work colleagues, understand company culture and the sector they are working in, and often leads to full- or part-time work post-placement.

This paper presents a case-study of the framework, preparation, assessment, outcomes, and feedback from industry of a semester-long immersive WIL placement program that is longer and programmatically different to other universities, and how it improves both employability and industry engagement for engineering students at Flinders University.

Introduction

The aim of most WIL placements is to enable students to integrate their theoretical classroom teaching and understanding with experiences within the workplace, to assist with developing their professional skills (Schonell and Macklin, 2019). While a standardised and uniform evaluation process for WIL may be absent, Schonell and Macklin have proposed 8 criteria for good practice within WIL that can be used for benchmarking and comparative purposes. These criteria are institutional embeddedness, relationships, student preparation, supervision, learning outcomes, curriculum, pedagogies and assessment (Schonell and Macklin, 2019, pg. 1198), all of which are evident and embedded within the WIL program for engineering at Flinders University. By following these 8 criteria, Flinders University have developed a semester-long immersive WIL placement program that is longer and programmatically different to other universities. The systematic and detailed design of this unique program has resulted in multiple Commendations from EA Accreditation Panels, the highest rating a program can receive when it is evaluated.

The WIL Program at Flinders University

All undergraduate single engineering degrees at Flinders University are 4 years (8 semesters), with most disciplines having a common first year (8 common topics taught across the first two semesters of study), before students begin to specialise within their chosen discipline. At the beginning of their third year (5th semester), students undertake a zero-unit 'Workplace Preparation' topic alongside their usual specialist technical studies to prepare them for their placement the following semester. The topic is offered in face-to-face, online (or 'virtual'), and 'on demand' modes, providing maximum flexibility to the student cohort. All sessions and all materials are recorded and uploaded to the student learning management system.

The preparation topic exposes students to industry professionalism and standards within the workplace, work health and safety requirements, interactive industry and past-student panels, networking evenings designed to help students to secure a placement, intellectual property counselling, WIL application assistance, resume and interview preparation, and WIL assessment, so students understand how they will be assessed while on placement a semester in advance. It is expected that all students identify, apply for, and secure their own WIL placement – locally, nationally, or internationally – with University professional and academic staff available for assistance, enabling them to practice and develop job-seeking habits prior to graduating and then securing their first job. If required, students can also seek additional support through the *University Specialist Employment Partnerships* (USEP) program, who have a virtual and on-campus presence and provide customised support for students with a disability.

Prior to a WIL placement commencing, an Industry Supervisor from within the WIL host company is appointed to supervise the student. This supervisor is required to have sufficient engineering qualifications and their role is to provide day to day supervision of the student, oversight of the WIL placement and the project/projects to be conducted. An Academic Supervisor from the University within the student's engineering discipline is also allocated to supervise the student throughout their placement. This staff member is responsible for monitoring and assessing the academic journey and works in partnership with the student's Industry Supervisor. Additionally, prior to and during their placement, students receive support from the WIL Team (a team of Professional Staff who manage and support all WIL placements), the WIL Topic Coordinators (two Academic Staff members) and the WIL Academic Lead for each engineering discipline.

Once engineering students have completed the mandatory WIL preparation topic, they spend their entire 6th semester embedded full-time with an industry partner for their placement. The placement is equivalent to 3 topics, which is 13.5 units of credit, where 4 topics or 18 units is considered a full-time study load. The fourth topic that completes the full-time load for students in their 6th semester is a core Engineering Management topic that is intentionally run in parallel to their WIL placement in a complementary format. Discussed in the following section, this topic provides students with essential project management tools that are then put into practice during their WIL placement, and reinforced through an assessment item related to their WIL project(s).

Student feedback highlights the advantage and benefit that they feel comes from the Flinders WIL program:

“I did a 20-week placement overseas and it was the best thing I’ve done in this degree by far”.

“I enjoyed working on a big project, and gaining experience within a company. This is much different from any assignment or project I have ever worked on at Uni, these were all small in comparison”.

The Flinders University Process

Figure 1 provides an overview of the timeline of the three WIL related topics at Flinders University, with the general contents of each topic also shown. Students typically complete the Workplace Preparation subject in the first half of the year, with the remaining two subjects completed in the second half, however students have flexibility with the timing depending on their Study Plan. The 20-week WIL placement topic has Workplace Preparation as a pre-requisite which ensures students are fully compliant prior to applying and interviewing with external host companies. Engineering Management and the 20-week WIL Placement topics are co-requisites where the former delivers important management-based tools and skills required to complete the assessments spread throughout the 20-week WIL placement topic itself. The Engineering Management topic is run in intensive mode (designed to cover all content within a single week of daily content, plus 4 additional weeks of 1 day per week), so all content is delivered in time for the assessment deadlines during the 20-week WIL placement topic.

As can be seen in Figure 1, four separate surveys are run throughout the WIL topics to collect data at key moments. The first two surveys are run within the Workplace Preparation topic to gauge the impact this topic has on the students and to assess their preparedness for their WIL placement. The ‘Warm up’ survey is conducted at the start of the topic and prior to the university providing any formal education about integrating into industry. The ‘Cool down’ survey is then performed at the completion of this topic once resources have been provided to them and information sessions delivered, such as networking events or industry and student panels.

The 20-week WIL placement topic begins with students sourcing their own placements where industry hosts need to sign legal Placement Agreements and Work Plans. This paperwork ensures companies retain their own intellectual property (IP) and students are performing genuine engineering work relevant to their discipline. This topic then ends after the students have completed their 20 weeks of WIL, where surveys are sent to both the student and industry host to obtain feedback.

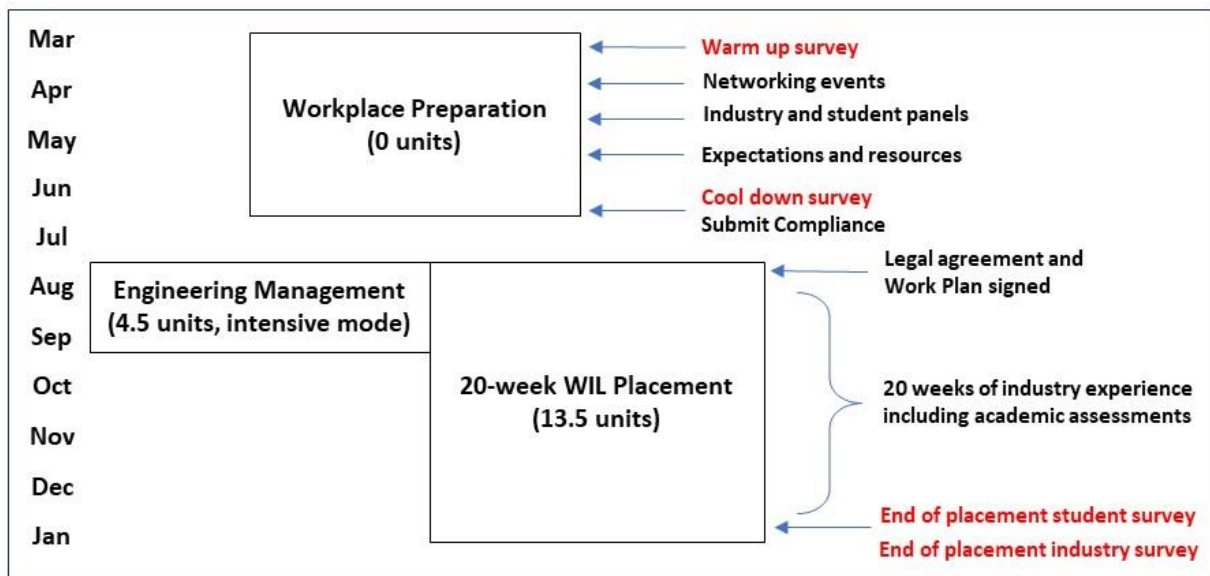


Figure 1 – The timeline and sequence of WIL topics for Flinders University

Growth of the 20-week WIL program

Unlike typical engineering WIL programs, the Flinders program also incorporates multiple STEM disciplines from across the College/Faculty. Since its inception in 1993, the Flinders WIL program has successfully placed approximately 1,800 students (with over 200 students on placement in 2022), working on authentic, discipline-related innovative projects including the design, development and commercialisation of industry identified innovations. The Flinders WIL program employs a unique, multi-layered and responsive structure to combine two important requirements: (1) industry need for work and innovation and (2) student need for an authentic WIL experience. Unlike typical WIL programs, the Flinders WIL program incorporates multiple STEM disciplines. In 2009, the program was expanded from its initial remit (in the early 1990s) to place undergraduate engineering students and included science students undertaking double degrees with innovation and enterprise. In 2010, in response to calls by the Australian Computer Society (ACS) to include WIL within all Computer Science (CS) and Information Technology (IT) degrees, the WIL program expanded to provide all undergraduate students in these fields with the option to undertake a placement initially for 12-weeks and later expanded to an optional 20-weeks. As late as 2019, the Australian Council of Deans of Science (ACDS) noted that less than one third of IT students undertake a WIL placement (Johnson *et al.*, 2019).

In addition to Science, Engineering and the CS/IT disciplines, the expansion continued in 2017, with Mathematics and the Design and Technology Innovation program students also included. The integration of WIL into courses across the spectrum of STEM disciplines is important for students and industry, to boost the innovation economy (Hordacre *et al.*, 2017). The successful expansion of WIL across disciplines, coupled with strong positivity from industry, was consolidated in 2022 to include all disciplinary areas throughout the College. Placements of 20 weeks are now available to all students enrolled in all STEM degrees, including Natural and Biological Sciences, Physics, Geospatial Information Systems, and Surveying. Industry has been very welcoming of the expansion of WIL into other disciplines. The feasibility of increasing traditional 12-week placements over the Christmas Holiday break to a 20-week semester long placement in the 2-year Master of Engineering (course work) degree is currently being considered. Recent discussions within the College have concluded there is a high industry demand for a longer placement matched with the desire for these Master students, who are mostly international students, to gain a deep and genuine experience in the Australian workforce. Expansion of the Flinders STEM WIL program from undergraduate to postgraduate level will likely be implemented soon.

"We are delighted to see the Flinders WIL program expanded across all areas of STEM. This has enabled us to offer additional WIL placements to students in science degrees, including physics, chemistry (nanotechnology) and environmental sciences. We believe that early industry integration equips students with critical skills that increase their employability, and the Flinders WIL team has been exceptional in listening to industry needs, incorporating essential flexibility and linking passionate academic supervisors to each WIL project" (Science and Engineering Lead at host company, 2022).

State and National Statistics

The most recent national measures of employability reveal that Flinders engineering graduates are employed at a higher rate compared to the: average of remaining South Australian universities, national average, and Group of 8 University average (see Figure 2). As can be seen in this figure, this trend was found to be true for finding any type of employment and for full-time employment, indicating employability beyond the immediate degree.

Industry partners consistently report back to Flinders University that they engage with the WIL program to identify talented students prior to their final year of study, and this often leads to part- or full-time employment. Data from post-WIL surveys indicate that almost three quarters (73%, n=326) of students received some offer of employment from their host company post-WIL. This is reinforced by industry survey responses and quotes from host companies between 2020-22:

“Have had a number of undergraduates through our CADET program from Flinders University and all have proved good candidates for employment”.

“We have a history of recruiting Flinders students, particularly from placements. [Student name] has been another good quality student”.

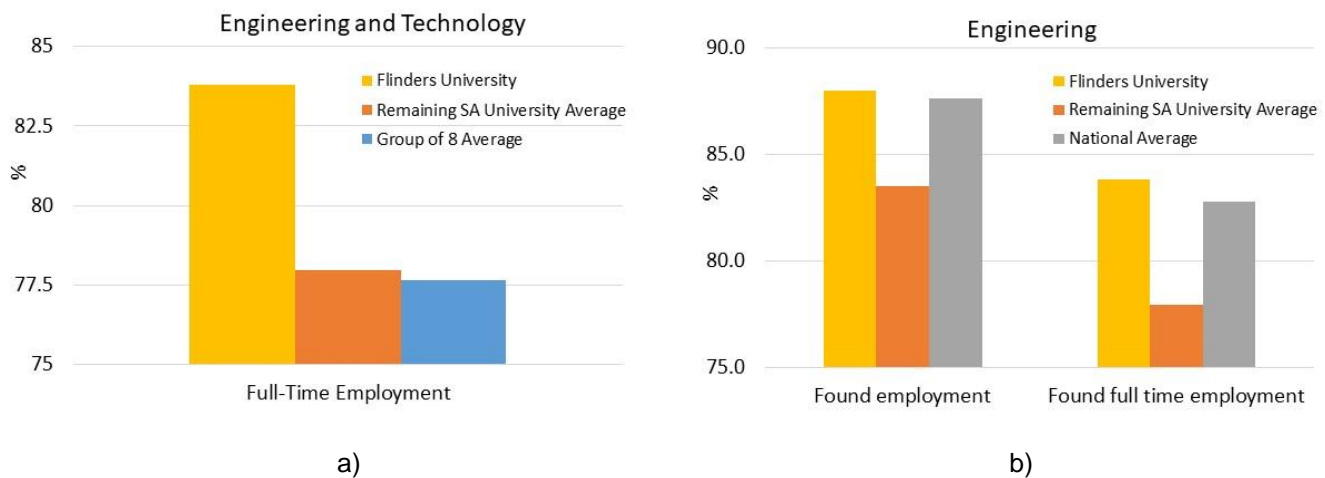


Figure 2 – Employment rates for graduates a) Good Universities Guide (2023); b) ComparED (2022)

A comparison of educational experience is provided in Figure 3, where again the data is supplied by Good Universities Guide and ComparED websites. This comparison reveals that Flinders University performs well for a wide range of educational experiences. This indicates that providing students with the opportunity to experience a full semester immersed in industry and away from the classroom can result in improvements across the board for student satisfaction levels. Key indicators such as Overall Experience, Learning Resources and Teaching Quality improve when students undergo a longer WIL placement as the University is supporting them directly with their passions and career aspirations.

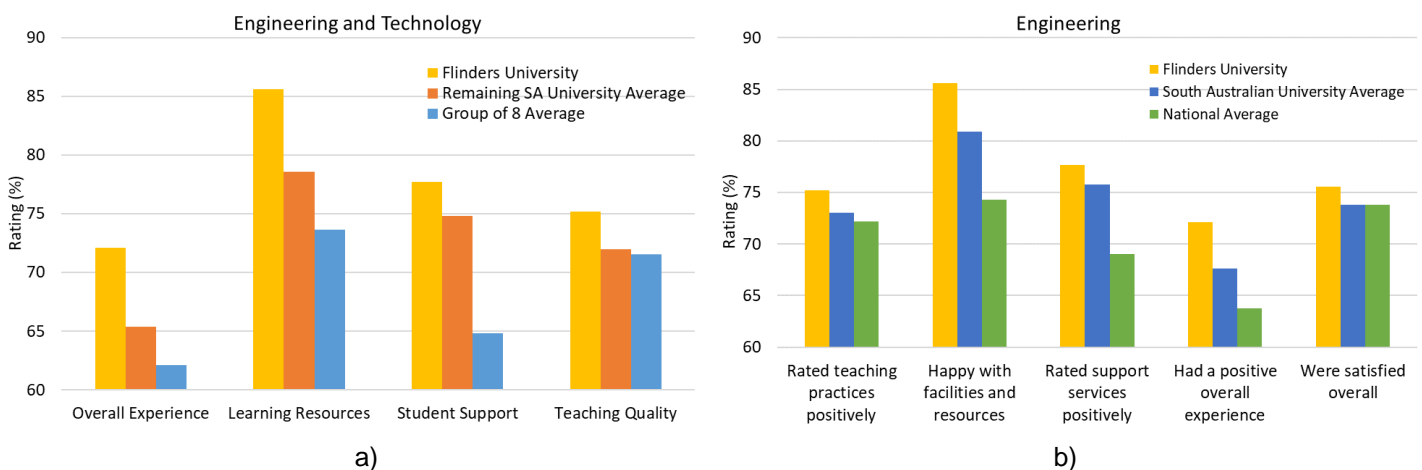


Figure 3 – Educational Experience Statistics a) Good Universities Guide (2023); b) ComparED (2022)

It is worth noting that the data presented in Figure 3 is provided from graduate surveys that reflect the whole overall degree program and are not specifically related to the WIL experience within the degrees. These graphs provide general context when comparing degrees from typical universities to Flinders University where a longer WIL placement is embedded. The following sections provide further data that has been collected within the WIL topics from Flinders University to deeply examine the impact of a semester long WIL placement. This data has been provided by surveying both the WIL students directly and their industry hosts.

Student Feedback

To evaluate student feedback throughout each cycle of the WIL program at Flinders University, three separate student surveys are conducted. The first two surveys are referred to as the 'Warm up' and 'Cool down' surveys (see Figure 1). These complementary surveys are designed to examine students' understanding and level of confidence before and immediately after the Workplace Preparation topic is delivered. Data for the last three years, when this format was first trialled is presented Figure 4. As can be seen in this figure, prior to commencing Workplace Preparation, less than half of the cohort knew where to find support, were confident they could find a placement, or understood the processes. After completing Workplace Preparation, students' reported knowledge improved substantially along with a three-fold increase in student confidence related to understanding the processes. This outcome underscores the high level of value the Workplace Preparation topic within the WIL program and the improvement in student preparedness.

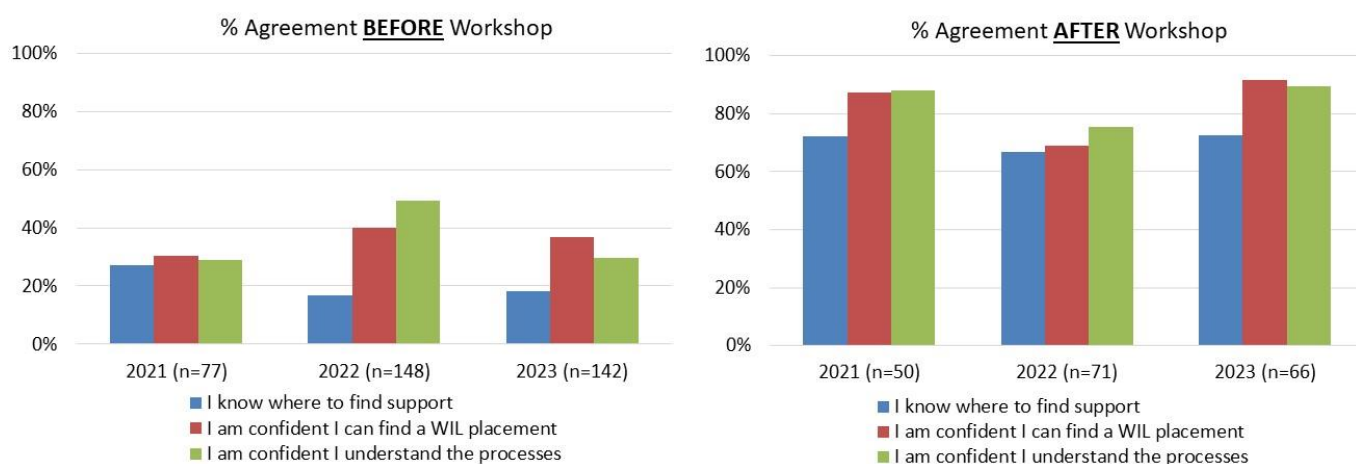


Figure 4 – Impact of Workplace Preparation Topic

Once a student completes their 20-week placement they receive an automated email with an end of placement survey link, as indicated in Figure 1. Data shown in Figure 5 indicates that more than 90% of respondents (n=331) felt they were better prepared to transition into graduate employment following their WIL placement, and more than 95% of respondents (n=331) were satisfied with what they achieved during their placement. Additionally, 88% (n=309) of students agreed they received a good level of support reinforcing the value of the WIL structure and framework designed to support students during placement. This aspect of student support for the WIL program received a specific 'Commendation' from EA during a 2021 Accreditation visit.

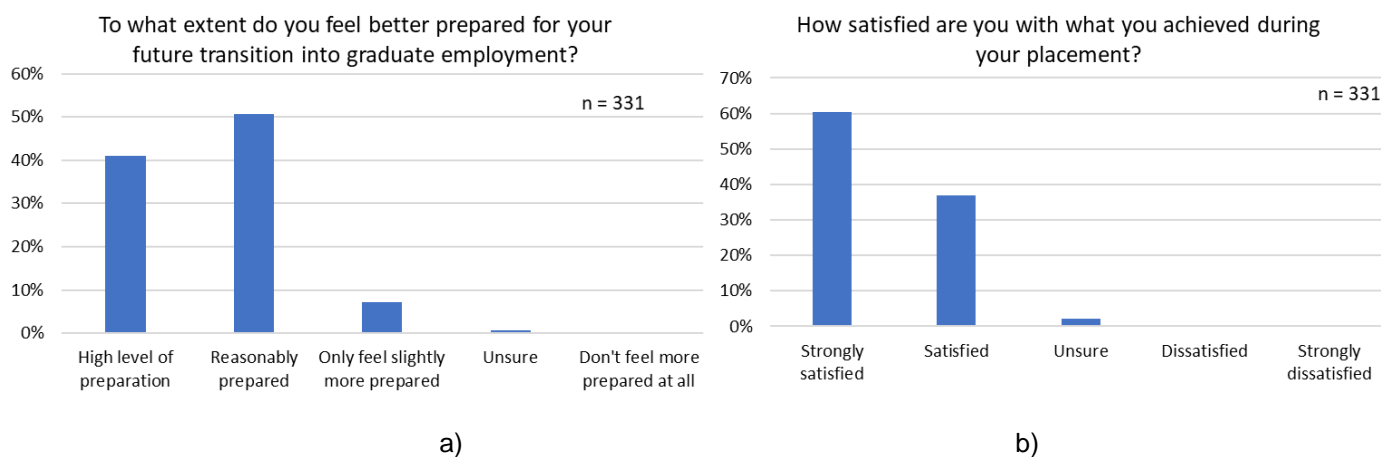


Figure 5 – Student feedback following their 20-week WIL placement

Industry Feedback

As indicated in Figure 1, surveys are also sent to all industry hosts to solicit feedback on their placement student and to ask for ways to improve the WIL program overall. Figure 6 shows aggregated data from more than 190 companies for showing their satisfaction about the quality of students they've hosted from the Flinders STEM WIL program.

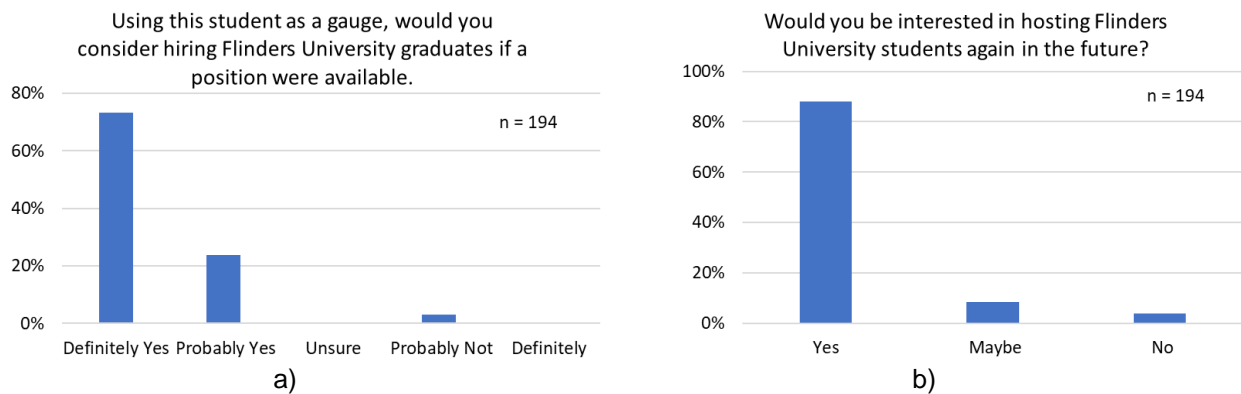


Figure 6 – Industry Feedback on the Flinders WIL program

Flinders University WIL students typically excel and are strong ambassadors for the College and University during their placement and the industry partners rate the students highly. In their own assessment, 90% of industry supervisors (n=195) evaluate Flinders University students at either High Distinction (85% and higher) or Distinction (75-84%) levels. The clear majority (97%, n=194) have indicated they would hire a Flinders graduate if a position were available, and 96% (n=194) of industry partners confirming an interest in hosting future Flinders WIL students. The survey provides an opportunity for WIL hosts to comment further on their placement student, the program itself, or anything else related to WIL at Flinders (for example, coordination of the topic, communication with the University, feedback for improvement, etc). The following quotes substantiate the value that industry sees in a semester long WIL experience:

"As an employer, the opportunity to embed a student into the work environment whilst they are still able to access support and oversight from the University staff provides a valuable point of difference to the traditional approach to providing work placements. The 5-month period provides opportunity for the student to be trained in the type of work they are doing, get actively involved in meaningful client facing work and hopefully see some of the projects they get involved in to completion. In our experience too often work placement students need to fill the time and get provided tasks to do, which doesn't provide the beneficial meaningful experience that they need. The Flinders WIL program addresses this through the longer time period, greater support from the University and the greater flexibility over the period of time that the student spends in the workplace. The Flinders WIL is a fantastic initiative and Flinders should be congratulated for the program".

"The 20-week model works very well with industry and gives both parties the best opportunity to integrate within the business, and provides an opportunity to continue with an industry led honours project".

"Flinders seems to have a more practical and hands on experience for students that gives students an upper edge on other universities. Students gain confidence and interpersonal skills that end up being very important when working in Engineering & Local Government".

Conclusion

The unique 5-month WIL placement model offered by Flinders has shown to provide benefits to both industry and students. It enables and inspires students to develop much needed employability skills while still being an undergraduate student. The in-house skills and confidence the students gain while placed in industry for up to 5 months simply cannot be reproduced in the classroom, and gives them a strong advantage compared to graduates from other universities in a competitive employment environment. Additionally, the benefits of a longer placement have

been recognised by the governing body of Engineers Australia where Commendations have been applied to this WIL program for four successive Accreditation cycles.

An immersive semester-long WIL placement achieves employability levels above state and national averages and almost all industry partners are satisfied with the experience. This success is based on a well-resourced program with a systematic and detailed design that addresses eight criteria for good practice within WIL. This longer WIL program has resulted in improvements across the board for student satisfaction levels when compared to universities providing WIL placements with a shorter time placed in industry. The Workplace Preparation topic, run one semester prior to the WIL placement, is highly valuable and effective in improving student preparedness, where a three-fold increase in confidence was recorded. Industry demand for longer placements is high with the clear majority of host companies indicating they are interested in hosting more Flinders students in the future and/or consider employing them.

References

- Accreditation Criteria User Guide – Higher Education (2023), *Accreditation Management System*, AMS-MAN-10, Version 2.0. Retrieved August 2, 2023, from https://www.engineersaustralia.org.au/sites/default/files/2019-09/AMS-MAN-10_Accreditation_Criteria_User_Guide-Higher_Education_v2.0.pdf
- Billet (2011), *Curriculum and pedagogic bases for effectively integrating practice-based experiences*, Final Report for the Australian Learning & Teaching Council (ALTC). Retrieved August 3, 2023, from <https://www.vu.edu.au/sites/default/files/CCLT/pdfs/billett-wil-report.pdf>
- ComparED*. Retrieved August 3, 2023, from <https://www.compared.edu.au/>
- Dressler, S., and A. E. Keeling. 2004. "Benefits of Cooperative Education for Students." In *International Handbook for Cooperative Education: An International Perspective of the Theory, Research, and Practice of Work-Integrated Learning*, edited by R. K. Coll & C. Eames, 217–36. Boston: World Association for Cooperative Education.
- Engineers Australia (2023), *Accreditation*. Retrieved August 2, 2023, from <https://www.engineersaustralia.org.au/about-us/accreditation>
- Hordacre, A.L., Spoehr, J., & Barnett, K. (2017). *Creative solutions – creativity, innovation and sustainable jobs in South Australia*, Senate Select Committee on the Future of Work and Workers, Australian Industrial Transformation Institute, Flinders University. Retrieved August 4, 2023, from <https://www.aph.gov.au/DocumentStore.ashx?id=1376f87a-aa0d-42f5-9ede-607d61ac0486&subId=562327>
- International Engineering Alliance (2023), *Accords*. Retrieved August 2, 2023, from <https://www.ieagreements.org/accords/washington/>
- Johnson, E., de St Jorre, T.J., & Elliott, J (2019), *WIL Snapshot Study Report*, Australian Council of Deans of Science (ACDS). Retrieved August 4, 2023, from <https://www.acds.edu.au/wp-content/uploads/ACDS-WIL-Snapshot-Report-Sep-2019.pdf>
- Schonell, S., & Macklin, R. (2019). Work integrated learning initiatives: live case studies as a mainstream WIL assessment. *Studies in Higher Education*, 44(7), 1197-1208. doi:10.1080/03075079.2018.1425986
- The Good Universities Guide*. Retrieved August 3, 2023, from <https://www.gooduniversitiesguide.com.au/>
- Zegwaard, K. E., Pretti, T. J., Rowe, A. D., & Ferns, S. J. (2023). Defining work-integrated learning. In K. E. Zegwaard & T. J. Pretti (Eds.), *The Routledge international handbook of work-integrated learning* (3rd ed., pp. 29-48). Routledge.

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