Work Integrated Learning for Engineering Students at Flinders University

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Abstract: *In this paper, an overview of our Work Integrated Learning (WIL) program for engineering students at Flinders University is presented. The Flinders WIL program is a twenty-week work placement undertaken in the second semester of the penultimate year of the engineering degree. Various issues regarding work placement are discussed. Our program has been in operation for almost two decades and it has consistently received positive feedback from both placement providers and students. It has also contributed to the high employment rates of our engineering graduates. All in all, our WIL program offers a "win-win" situation for students, the University and placement providers.*

Introduction

Within our Flinders University Engineering curriculum, one particularly successful program is the Work Integrated Learning (WIL), which is a program for undergraduate students to spend 20 weeks in industry during the second semester of their penultimate year. This differs from the standard engineering curricula offered by other Australian universities.

The WIL program offers many advantages to all parties involved. To the students, one advantage of having a 20-week WIL program is that this allows them to be involved in a more substantial technical project. Moreover, they will gain an understanding of the influences of commercial, economic, social, cultural, political, legal, industrial and environmental issues involved. After graduation, WIL students will also have an edge over fresh graduates from other universities in gaining employment with the 20-week work experience.

To the university, the advantages of the WIL program include the promotion of collaboration between industry partners and academic staff. This interaction will also enable the university to better understand the needs of industry and thus better tailor its courses to produce graduates with the breadth and depth of technical knowledge desired.

A particular advantage for industrial partners is that having a WIL student for 20 weeks full-time will allow the completion of a sizeable engineering project, which might never get done without hiring another permanent staff. Another benefit is that they have access to the expertise of academic staff and advanced facilities at Flinders University. They can also take this opportunity to assess placement students as prospective employees without prior permanent commitment. Moreover, there is an altruistic benefit of contributing to the education and training of the next generation of engineers.

All in all, Flinders Work Integrated Learning Program offers a "win-win" situation for students, university and industrial employers. Now in its 18th year of operation, WIL has been highly praised by students, staff, Engineers Australia, and most importantly by the very many cooperating employers who have sought and maintained involvement.

Overview of the Work Integrated Learning (WIL) program at Flinders

Work Integrated Learning (WIL) describes the directed or supported educational activities that integrate theoretical learning and the workplace [1]-[5]. It can provide a powerful learning experience for both students and staff. Good partnerships between all stakeholders are required for WIL programs to work well.

The WIL program at Flinders University consists of a number of activities to be carried out by students in the penultimate year of their 4-year engineering degree. Table 1 shows the standard schedule of the placement program activities for students enrolled in the WIL program.

Dates	**Activities**	**Assessment Due Date**
Semester 1	University approaches companies, and obtains profiles and likely placement details. Preparation of résumé / CV, drafting of letters of application. Preparation for interview (including mock interviews). Send applications to potential employers / providers. Selection by Placement Provider; confirmation of work placement; appointment of Academic Supervisor.	
Mid-year Break	Flinders Day Lectures: (e.g. Occupational Health and Safety, etc)	
Semester 2		
Week 1	Start of Work Experience	
Weeks 6-7	First visit by academic supervisor	
Week 10		Report 1
Week 11	Flinders Day Lectures: (e.g. Intellectual Property, etc.)	
Weeks 17-18	Second visit by academic supervisor	
Week 19	Flinders Day Lectures: (e.g. Professional Liability, etc.)	
Week 20	Conclusion of 20-week placement	Seminar synopsis
Week 21	Seminars Industry supervisors are invited to attend	Report 2 & Logbook

Table 1: Schedule of the Placement Program

Prerequisites

Flinders engineering students will usually undertake work placement in the second semester of the penultimate year, and must have passed most of the topics up to the level of the second semester of their penultimate year before they are eligible to enrol in the WIL program. This is to ensure that the students have a minimum standard of academic knowledge to cope with the challenges of the industrial placement.

Occupational health and safety induction

The University has a duty of care which extends to the students on work placement. Hence the University is responsible for ensuring that placement providers recognise and accept their common law duty of care and OHS legislative responsibilities. The placement provider also has primary responsibility for the health and safety of the students when they are on placements. Prior to the commencement of work placement, students are given an overview of basic workplace health and safety issues by the University. The placement provider must also give students a worksite OHS induction.

Application for job placement

As part of the training, students have to apply for the placement positions themselves. Our school will assist the students by making inquiries to potential work placement providers to see if they are interested in supporting our program. Interested placement providers will then fill in a form with information including the job nature of the work; salary information, etc. This completed form with contact details will be placed on the intranet for students only enrolled in the WIL program to access. A student interested in a placement position will apply to that vacancy directly. We normally do not interfere with the interview process because it would be unfair to allocate a work placement of higher pay to one student and lower pay to another student. Even though we have guidelines for work placements for remuneration which is approximately 70% of a graduate engineer's salary, the amount of remuneration is still up to the individual placement provider and so some students may work on a voluntary basis.

Placement Visits

There are at least two placement visits by academic supervisors over the duration of the work placement. The first visit usually happens at the commencement of the work placement. The purpose of the first visit is to examine the workplace in order to ensure that our students have appropriate induction provided by the placement providers. Various issues of the work in which the students are involved will also be discussed, for instance, issues regarding students involved in classified or commercial-in-confidence materials. We will also have to make sure that students get regularly feedback from placement providers as most students will not have prior work experience to understand the expectation from industry. It is also expected that our students will be treated as regular staff; so that they will be involved in all the meetings with a chance to understand the organisation culture.

The second visit will usually take place at the end of the work placement. This is a chance for our academic to assess and examine the quality of work carried by the student over the period of the work placement. This is important because students will very often not be able to take their work outside their workplace to show to their academic supervisor.

During both visits, the academic supervisor will usually meet with all parties first to discuss about general issues regarding work placement. The academic supervisor will then meet with the placement supervisor alone to discuss the student's performance, their progress, the work quality; and etc. The academic will then meet with the student alone to discuss what they think of their own performance, as well as what they think of the placement supervisor's assessment of them. The academic supervisor has a task to ensure that there is a mutual understanding between the placement supervisor's and student's opinion on the quality of work performance.

The assessment of the student performance as evaluated by the three parties, namely the placement supervisor, the academic supervisor and the student himself, has to be generally consistent. If there is a big discrepancy, the academic supervisor has the task of resolving the differences. This may involve the academic supervisor providing a better understanding of the university's assessment criterion to both the student and the placement supervisor, and suggesting a better feedback mechanism between all parties.

Flinders Day Lectures

One of the key elements of the WIL program is that a series of lectures given by leaders within the fields of engineering will be organized for our students to give them insights into real world operations. The lectures will also include a selection of topics, such as occupational health and safety, intellectual property, task planning and scheduling, business structures, company law, methods of work, industrial relations, human resource management, management accounting, quality assurance, contract law, economics, risk management, insurance, standards, documentation, industrial design, marketing, advertising, public relations etc.

Quality assurance of the WIL experience

There are two issues on the quality standard of the WIL experience. One is the quality of the WIL experience itself and the other is the quality of the work carried out by the placement student. The quality of the WIL experience is maintained through the following:

1. Prior to the commencement of work placement, the students and their placement supervisors have to come up with an agreed work plan. It is in a form which needs to be submitted to the academic supervisor from Flinders University for approval. It is to ensure that the work to be carried out over the 20 weeks is of a quality up to the standard of the university.
2. To ensure ongoing quality assurance, the placement supervisor has to communicate with the academic supervisor at least once fortnightly. This is to report on the student's progress, to discuss the student's performance, to put forward the forthcoming tasks in which the student will be involved, and to discuss any problems raised. A record of this communication has to be filed for future reference. As a requirement for quality assurance, the communication between all parties has to be kept as a record.
3. Two placement visits by academic supervisors to assess and examine the quality of work carried by the student over the period of the work placement

The quality standard of the work undertaken by the student during the WIL experience is important as it represents one full semester of academic loading, and the quality of the work is assessed by a number of assessment components submitted by the students.

1. A logbook to record the main activities undertaken, i.e. sources of information; details of theoretical or experimental design, methods and techniques; details of instrumentation and measurement equipment or devices; results and analysis of experimental work; records of significant meetings; etc.
2. Two technical reports; the first report is on the issues relating to the organisation and operation of the company, and the student's role within it, and an introduction to the project work to be attempted; the second report deals with the project work undertaken by the student.
3. A technical presentation given at the end of the 20-week placement.

Rationale for the 20-week WIL program

20 weeks WIL versus 12 Weeks Work Experience

The standard engineering degree program in Australia will include a 12-week work experience over the summer vacation period without academic supervision. Our WIL program differs from this standard in that it requires students to undertake 20 weeks of work placement in the second semester of the penultimate year with a designated academic supervisor to oversee the whole placement program.

A particular advantage for industrial partners is that having a WIL student for 20 weeks full-time will allow the completion of a sizeable engineering project, which might never get done without hiring another permanent staff. Another benefit is that they have access to the expertise of academic staff and

advanced facilities at Flinders University. They can also take this opportunity to assess placement students as prospective employees without prior permanent commitment. Moreover, there is an altruistic benefit of contributing to the education and training of the next generation of engineers.

20-week Work Placement versus one semester of Academic loading

For our Flinders engineering programs, students undertake 20 weeks of work placement in lieu of one semester of academic loading, where one semester of academic loading is approximately equivalent to four elective topics. When comparing Flinders engineering programs with other standard engineering programs, the difference is the choice between four elective topics and the 20-week WIL program of solving real-world engineering problems.

The main objective of university education is not to teach a student everything, but rather to equip a student with sufficient knowledge to learn new materials and solve problems by himself/herself. On-the-job training is one way for a student to learn a particular field in more depth. For example, most universities will only cover the basic theories of a radar system. A student will only be able to learn the full details of a complicated radar system for defence applications if he/she has a placement within the defence industry. One of the objectives of our WIL program is to provide our students with some on-the-job training within our engineering program so that they have a chance to work on real-world problems instead of classroom simulations. If the materials to be included in our engineering program are selected wisely, there will be no significant loss in the core program and the experience of solving real-world problems in the work placement will benefit the student with a more balanced education. Moreover, having such a real experience will enable students to build up their confidence in their engineering profession, and this will also enable students to understand their actual field of interest, so that they can choose the area in which they wish to specialise in their final year of study. The accreditation of the Flinders engineering degrees by Engineers Australia confirms that our engineering curricula meet all the requirements for engineering degree programs.

Implementation issues

Offshore work placement program

There are a number of issues to consider for students doing off-shore work placement. For example, due to the different work regulations in different countries, there may be different occupational health and safety standards of which students should be aware of. Moreover, as a university cannot normally provide work cover insurance overseas for work placement students, this may be an issue if the overseas country does not provide the same level of work cover for the students. Off-shore work placement visits by the academic supervisor may also not be possible due to teaching, or other commitments. In other words, the same level of supervision offered to local WIL students cannot be provided to those off-shore WIL students.

Equity Issues

As some WIL students will receive remuneration from their work placement providers while some other WIL students will work on a voluntary basis, the issue of inequity of work placement remuneration is often questioned that whether all students doing the WIL program should receive the same level of remuneration. In the consideration that all our WIL students have equal chances and opportunities to apply for any placement positions, whether paid or unpaid, and we do not interfere with the placement application process, the process is deemed to be fair. For example, if one student outperforms the other students with one's academic records, personal qualities, etc. in order to secure a placement position which is paid, he or she deserves it. If a placement provider chooses to offer an attractive remuneration package to a student it selects, it is a contract between the placement provider and the student. Our main concern is to make sure that the training program provided by the placement provider is appropriate and up to standard. The actual amount of remuneration offered to a student by

a placement provider can be considered as confidential and the student is not required to disclose the amount indeed. Inequity can only be judged with everything else being equal. Moreover, inequity should not only be judged based on monetary consideration. For example, if placement provider A offers an unpaid position with an excellent training program while placement provider B offers a paid position with a moderate training program, it will be difficult for us to judge whether it is unfair to student A who works for placement provider A because the position is unpaid or it is unfair to student B who works for placement provider B because the training program is not as good. All in all, work placement is part of the education training, and getting remuneration should be considered as a bonus.

Conclusion

The WIL program at Flinders University has been offered for almost two decades. During this period, over 100 companies and organisations have supported our WIL program, and we have received many positive comments from placement providers towards our program. As an indication of the level of placement providers' satisfaction of our student performance, there have also been many cases that the placement providers offer permanent positions to our students after graduation. From an academic point of view, our students come back more mature after work placement and usually perform better in their final year topics. All in all, our WIL program has been a success in our engineering education by providing hands-on experience to students in solving real-world problems.

References

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