

## Evaluating the WIL experiences of engineering and built environment students (Part 2)

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***Abstract:** The professional bodies that accredit degrees in our faculty require students to complete periods of work experience. Recent initiatives to promote work integrated learning (WIL) provided an opportunity to explore students' experiences of these placements. We administered an electronic survey comprising quantitative and open-ended questions. Key findings from the open-ended questions are presented here. Students reported both positive and negative aspects of their placements. Most considered the experience to be valuable and one that complemented their studies. They felt that the placements enhanced their understanding of their chosen careers and improved their career prospects. Students also outlined difficulties in obtaining information on WIL and in securing placements. Maintaining a balance between university and work requirements, and the requirements and expectations of the real-world work place were problematic for some students. As well as confirming the important benefits of WIL, this study highlights strategies for enhancing students' experience of their placements.*

### Context

This paper describes one of 20 investigations currently being conducted as part of the 2009 ALTC National Teaching Fellowship for Work Integrated Learning. The intention of the fellowship is to “generate, embed and widely disseminate a set of evidence-based approaches for the effective design and enactment of work integrated learning (WIL)” (Billett, 2010). Newcastle University is one of six universities participating in this project, and this paper reports on one of the case studies provided by the University. It describes the experiences of industrial placements of undergraduate students in the Faculty of Engineering and Built Environment (FEBE).

### WIL at Newcastle University

Newcastle University has recently embarked on an initiative to provide all students with opportunities to engage in WIL. The University's definition of WIL is that it is “...the term used to describe educational activities that integrate theoretical learning with its application in a workplace, profession, career or future employment.” WIL is “being made available for a broad range of undergraduate programs and can be recognised through assessment and credit. The WIL experience can be off or on campus, real or simulated, depending on the discipline area, but must involve clearly stated outcomes, assessment and be consistent with quality teaching and learning.” (The University of Newcastle, 2010b).

## **WIL in the Faculty of Engineering and Built Environment**

FEBE offers a comprehensive range of undergraduate degrees in engineering, architecture, construction management, surveying, industrial design and computer science. Most of these programs require students to complete periods of industrial experience as part of their undergraduate studies. These placements are mandatory requirements of the professional bodies that accredit these degrees. For example, the Australian Institute of Building requires construction management students to complete 80 days of industrial experience (AIB, 2006) and Engineers Australia (the institution that accredits engineering professions in Australia) requires engineering students to complete 12 weeks of industrial experience (A. Bradley, 2008). The processes and procedures FEBE currently employs to facilitate these placements are the subject of the survey reported here.

### **Facilitating and assessing industrial placements**

FEBE students identify and arrange their own industrial placements. To assist them, they are encouraged to make use of the University's Careers Service and, depending on their discipline, provided with lists of employers to approach. Students usually complete their placements during University vacations, but some study and work simultaneously (For example, the construction management degree is offered online to distance learners. Many of them are of mature age and in full-time employment). Students may consult university staff about placement opportunities, but staff generally play no further part in placements until students submit evidence of their experiences. A range of documentation is called for in this regard, with some degree programs requiring students to submit formal reports and others simply requiring employers to confirm the duration of placements and the nature of the work students completed.

An exception is students who obtain UNISS scholarships (The University of Newcastle, 2010a). These students are recruited through advertisements and selected based on interviews. Their industrial experience activities are assessed through a 'Scholar Placement Report' and a 'Scholar Placement Evaluation'. In addition, representatives from sponsoring organizations are asked to complete a 'Sponsor Placement Evaluation'.

### **Our survey**

Current University-wide focus on WIL and participation in the ALTC WIL Fellowship provided opportunities to review the manner in which industrial placements were facilitated, administered and assessed in FEBE. A survey was conducted "to elicit baseline data about FEBE students' experiences of their industrial placements and WIL." (Sher, 2010). It was administered between 6th and 24 May 2010 and delivered electronically through SurveyMonkey ("SurveyMonkey," 2010). 3521 students were invited to participate (951 from the School of Architecture and Built Environment and 2570 from the School of Engineering and the School of Electrical Engineering and Computer Science). 210 students responded, a response rate of 6%.

The survey comprised 14 quantitative and 6 qualitative questions. Only qualitative data are reported here. An analysis of the quantitative data was presented at Australian Collaborative Education Network (ACEN) 2010 conference (Sher and Sherratt, 2010).

Open-ended responses were imported into NVivo qualitative data analysis software (QSR International Pty Ltd, 2008) for analysis. Qualitative content analysis (Graneheim & Lundman, 2004) was used to identify codes relating to the data gathered from the six open-ended questions. A summary of the responses is provided below.

#### **1 What was important for you to know before you started your industrial placement?**

Some students reported a general lack of information on all aspects of their industrial placement. They were concerned about whether the industrial placement was mandatory and whether previous work experience would satisfy the industrial experience requirement. How to obtain a placement and the lack of support from the university was of concern to some students. Other students wanted information on possible positions for students or any strategy for finding a placement.

Many students mentioned work-related knowledge and expertise which they had needed or may need before they started their industrial placement. The knowledge considered necessary was often general. Some students pinpointed specific aspects that they needed to know; a number of comments related to the computer programs that were relevant to the industry and how to use them. CAD and computer drafting were specifically mentioned, as well as 'the industrial standards and practices of drafting'. Other specific knowledge-related areas were occupational health and safety, and ecology. Time management skills (to manage the work-university balance) were felt to be important.

A number of students expressed the need to know about their role in the workplace during their industrial experience.

For many students, the practicalities of their industrial experience were considered important. These included university-related requirements relating to the duration of placement (including the number of hours required). Respondents also felt it relevant to know the nature of the work they were allowed or expected to do. Students also wanted to know the requirements relating to payment. A few students mentioned the time-management implications.

Requirements for recording or reporting on their experiences were also considered to be important by a large number of students. Students also wanted to know what the university needed from their placement employer as a record of experience.

## **2 What aspects of your industrial placement did you find most helpful for your career plans?**

For some students, the industrial placement provided confirmation of their career choice. A considerable number of students found that the industrial experience had refined their career paths and goals. For some, it was to specialise in specific areas. For others, it gave them an opportunity to determine what would give them personal satisfaction or what they wanted to achieve. For some, it provided guidance on broader choices in employment.

For many students, it was the general experience of the workplace that increased their understanding of what the respective industries involve. It also provided them with an insight to what would be expected of them in the workplace. Some students benefitted from experiencing a variety of positions within the workplace. For some students, all aspects of the industrial placement were helpful whilst others highlighted particular aspects.

A relatively large number of students considered that the experience had provided them with practical help for their careers. They felt that having actual workplace experience and being able to state this would assist them obtaining employment after they qualified.

Students also considered that the placement had provided them with additional learning opportunities. They specifically mentioned the application of theoretical knowledge to the workplace and using university acquired knowledge and skills. They had also learnt about elements which they felt could not be learned at university. They considered that the experience had provided insight into specific aspects of employment or new aspects of their future employment. A few students suggested that hands-on learning was perhaps a better learning style for them personally. For two students, having a mentor had been extremely helpful.

A considerable number of students stated that they had learnt management related skills, particularly in communicating and interacting with people. They also mentioned becoming more knowledgeable about project management and problem-solving skills. Company structure and professional skills were also noted.

## **3 What aspects of your industrial placement did you find difficult?**

A number of students indicated that they had had no difficulties in their placements. Some respondents reported having successful experiences. For a number of respondents, the most difficult aspect was obtaining a placement.

Students mentioned the high level of expectations in the workplace, regarding knowledge, time-frames and work quality.

Some students reported finding it difficult to adapt and understand working practice. For a few respondents, fitting into the workplace and working with established teams was not easy. General management aspects and specifically time-management issues were highlighted. A few found some aspects troublesome e.g. the management style.

Some specific areas of the work itself were reported to be troublesome. The aspects which were considered difficult often regarded the relationship between what is taught at university and what is expected in the workplace. Some of these were general comments about the fact that there was a difference; other respondents mentioned an unspecified lack of knowledge or highlighted specific aspects which they had not studied at university. Whilst some students considered that they had learnt more at work than at university, others felt that there was a substantial variation between how much is learned at university and on placement.

The lack of support and guidance from the university during placement was an issue for a few students.

For some students it was the practicalities of actually working that they found difficult. These related to the long hours of work, the fieldwork that was required and adjusting to a monotonous office lifestyle.

Managing the work-university balance was problematic for some students. These concerns also included reference to the relevance of university work.

#### **4 What effect has your industrial experience/work had on your studies?**

Many students generally felt that the effect on their studies had been positive. The effect for most students has been in providing them with an opportunity to increase their knowledge and skills. For many, they developed a better understanding of what they were studying. Respondents found the practical experience had helped them particularly understand theory and how this is applied in the workplace. Work experience had also helped many respondents realise the relevance and usefulness of their university studies/topics studied at university.

Learning and understanding management-related aspects were seen to be important. This included general management styles and systems skills related to time-management or other management skills.

Students maintained that their work experience had decreased the time they needed to spend on assessments. It had helped respondents by giving them real world examples of topics in assessments and/or lectures. Other learning-related effects that respondents highlighted were that work experience had provided them with a different approach to studying or the extent of knowledge that they needed.

A few students felt that it had confirmed that learning in the workplace was more interesting and outstripped that at university. A small number of students felt that the experience had also emphasised the big gap between university and the workplace.

A small number of students reported that their work experience has made them more aware of the importance of obtaining a degree to pursue their career. A few mentioned that it had broadened their knowledge of possible future employment or strengthened the career decision they had made. For a few students, it had helped them with decisions about what particular area they wanted to specialise in. Some students stated that their work experience had given them a greater understanding of their chosen field of work. Others felt that it had provided an opportunity to increase their understanding of working in the real world and the flexibility needed for this.

A number of students reported increased motivation and greater interest in their studies and career. It had also given respondents a background for their studying. In contrast, one student found that he was now demoralised about university study.

A number of students felt that employment in a study-related field should be formally acknowledged by the university.

A fair number of students commented on the difficulties they experienced in maintaining a balance between their work (whether full-time employment or industrial placement) and their university studies. The consequences on studying were mentioned e.g. less time for studying generally, lower

assessment marks and failing subjects. Some students found their placement stressful and impinging on personal time.

Those students in full-time work highlighted the need to work for financial reasons. The work-university balance is even more difficult to maintain the longer the student is employed. The lack of flexibility in employment and amongst employees was mentioned by a number of students. Students did express the view that working (full or part-time) and studying had enabled them to develop better time management skills.

A very limited number of students felt that their industrial experience had had no effect on their studies. A couple of respondents questioned the relevance of industrial placement for his/her specific degree program.

## **5 How could your industrial experience/WIL have been improved?**

Some students stated that there was no improvement needed or possible. Respondents felt that the success of the industrial experience depended on both the employer and the university.

Students did suggest ways to improve their industrial placement. Some improvements related to the university and their study programs. The need for greater guidance, support and/or information from the university elicited the greatest number of comments from respondents.

Assistance in finding placements was often voiced. Some students felt that the university should be involved in organising the placement, whilst a few felt that some students should get help based on their university-related performance. A small number of respondents expressed the need for guidance, both general and specific.

General information regarding the placement, as well as the specific requirements were needed by the students.

Better communication and information dissemination to employers was also considered important. Some respondents suggested an agreement or partnership between themselves, their employer and the university.

Respondents also stated that their placement could have been further improved if they had had additional help and support from their employer or work colleagues. For some, this support would most appropriately be in the form of a mentor. For a small number of respondents, higher pay was important.

A greater congruence between university and workplace would have been of benefit according to some students.

The students who felt that they could have directly played a part in improving their experience were extremely few.

Regarding practical requirements, respondents felt that a longer industrial placement would have made the experience more valuable. More opportunities to experience different areas of work would have been of benefit. A few students suggested experience at different companies, or more frequent placements relating to specific aspects of the degree program.

## **6 Did the knowledge and experiences gained during your placement consolidate with, or show relevance to, the information provided in your degree?**

The majority of respondents stated that there was consolidation of knowledge/experience from the workplace with the information provided by their studies. However, respondents did not often give details about this, tending to respond to the affirmative or else with superlatives. A number of students added comments regarding the general importance or impact of this link between the workplace and university study. A few students mentioned the importance of having the practical experience to refer to when completing university-related work. Some respondents reported specific aspects/topics which were particularly relevant. A small number of respondents felt that the learning aspect was significant.

A considerable number of students stated that there was some consolidation of knowledge/experience from workplace with information from their degree programs; their comments tended to be generalised. This partial consolidation was considered to vary from basic to respondents reporting consolidation of some aspects of their program. A number of these students identified those specific aspects which had been beneficial; these included technical aspects (e.g. quantity and estimating techniques, hydrology) and managerial aspects (e.g. team work, communication skills, report writing, 'people skills').

For some students, the industrial experience highlighted short-comings in their degree programs. Some mentioned that the industrial experience had provided much needed additional relevant skills and knowledge. A few reported that the university programs could be improved or made more relevant. The degree programs were considered by a few respondents to be too theoretical or not specific enough, whilst a few considered the university programs to be too broad and general.

Some respondents felt that their experience had highlighted the different approaches taken at university and in the workplace. A couple of students emphasised the differences in focus between the workplace and university and the importance of practical experience for some degree programs/careers.

Some respondents considered that they had learned skills which were only marginally relevant to their degree program. For a few students, the timing of the placement had curtailed the potential benefits.

A small number of respondents reported that the industrial experience was not relevant to the information provided in the university program.

## Discussion and recommendations

FEBE currently enrolls approximately 2110 EFTSL (Equivalent Full-Time Student Load) students. Facilitating WIL (as defined earlier) for such a large cohort presents significant challenges. Our faculty has elected to deal with these in a pragmatic manner. Students secure their own placements and submit evidence of its completion to staff. Completion is monitored as a 'milestone' with students being deemed ineligible to graduate if the said milestone is incomplete. Extensive use is made of Internet webpages to brief students about their industrial placements but it is clear that students would benefit from more detailed information and direction.

Students overwhelmingly found their placements to be worthwhile and valuable experiences. Many saw these as opportunities to enhance their career prospects as well as to supplement and consolidate their university learning. Some students, however, identified miss-matches between what they experienced in at work and the courses they studied at university. It could be that this situation is exacerbated by a lack of communication between industry and academics. Logistics and resource constraints make it difficult for university staff to liaise with industry representatives and thwart comments such as 'Tasks performed were not related to content learned at uni'. Improving communication between industry and academics would benefit all concerned.

The work-place presented students with an array of problems and challenges. A large number of them found it difficult to secure a placement, and others experienced difficulties adapting to the challenges of work. In this regard the manner in which industrial placements are facilitated in our faculty could be improved. While our university offers a wide range of student support services, students are generally left to locate and exploit these themselves. A more formal approach to alerting students to these sources of assistance would, in all likelihood, have provided re-assurance and support to some of those surveyed.

Being able to balance the demands of work and study continues to be problematic. The extent to which students currently engage in work (whether part- or full-time) is high, and aligns with other discipline related surveys (Lingard, 2007; A. Mills, Lingard, & McLaughlin, 2007; O'Leary, 2006). This trend is in common with other Australian Universities, and is arguably representative of a worldwide shift in the ways students engage in tertiary level education (Ford, Bosworth, & Wilson, 1995; McInnis & Hartley, 2002).

## Limitations

This paper should be read in conjunction the results for closed questions (Sher and Sherratt, 2010).

The modest response rate we achieved was despite several best practice approaches we used. For example, we structured the survey to elicit constructive criticism, we reminded students about the survey, and we offered ten cinema tickets to be awarded at random to those completing the survey (Nulty, 2008). Factors contributing to the low rate include timing (as the survey was administered towards the end of the semester) as well as the gender and age profile of the students. Women are reportedly better at responding to email surveys than men (Sax, Gilmartin, Lee, & Hagedorn, 2008); the relative preponderance of males not only enrolled in the programs, but also responding to the survey, may reflect this.

Generally, although students are familiar with the internet and emails, they do not necessarily respond better to email surveys (Sax et al., 2008). In 2009, Newcastle University moved from paper to electronic surveys of students' views about their courses. The response rate was substantially lower for the electronic version. This echoes the observations of Shih and Fan (2009) who noted that postal surveys achieved higher rates than email surveys.

Despite these limitations, this survey has provided useful data, as well as insight into students' attitudes and rates of responding to internet-based surveys.

## Conclusions

This paper provides preliminary indications of the factors that concern engineering and built environment students engaging in periods of industrial experience. These placements are a mandatory accreditation requirement for the vast majority of degree programs offered in FEBE, making this an issue of considerable importance to the majority of students in this faculty.

This survey provides a robust overview of relevant issues. It has highlighted the relative efficiency of the current system, considering the modest burden placed on the faculty and its staff. The study has also pinpointed those aspects of industrial placements (e.g. sources for helpful advice and information) which appear to be in need of overhauling and upgrading. The needs of those students who are not working or who are working in unrelated employment may need particular consideration. Although the data are weighted in favour of the construction management students, it is likely that the issues raised by these respondents are similar in nature to those of the engineering students.

The University of Newcastle is working to provide students in all faculties with opportunities to engage in WIL. This survey is thus timely and can provide a baseline on which to judge future changes to the effectiveness and efficiency of the process.

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