Student perceptions of their workplace preparedness: Making work-integrated learning more effective

GERRY RAYNER[1]
THEO PAPAKONSTANTINOU
Monash University, Clayton, Australia

Higher education is undergoing generational transformation, as universities adapt to the needs of a 21st century workforce. This study investigated student perspectives of a work-integrated learning (WIL) placement program, firstly in relation to its longer-term worth since they had completed it, and secondly, with respect to its value regarding course relatedness and in enhancing their employability and/or workplace readiness. Participants answered a series of learning and career related questions, both immediately post-placement and six or more months later. Of three learning-related questions, students were generally positive about one and strongly endorsed the other two. Contrastingly, over time, students downplayed the initial value of their WIL with respect to the knowledge gained being relevant to their future careers. Students were in moderate to strong agreement with other career-related questions, notwithstanding concerns about their future employability. Implementation of a work skills development program is recommended to maximize the effectiveness of WIL. *(Asia-Pacific Journal of Cooperative Education, 2015, 16(1), 13-24)*

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BACKGROUND AND CONTEXT

A central tenet of higher education is the provision of high-quality skills development to cater for the cultural and economic requirements of today's societies, while at the same time providing accurate and informed perspectives and modeling on future societal needs under increasingly globalised conditions (Altbach, Gumport, & Berdahl, 2011). Over the past decade, the traditional model of a university education, namely the inculcation of discipline-specific knowledge and skills, has been called into question, in terms of both university marketing perspectives and feedback from employers (Tomlinson, 2008). Business and industry have increasingly called for universities to generate better prepared, perhaps even work-ready graduates (Organisation for Economic Co-operation and Development, 2004; Peach & Gamble, 2011), and the list of must-have graduate attributes has become ever more lengthy. For example, in addition to employer demands that university graduates possess a high degree of technological competence, Parks (2012) describes the necessity for effective teamwork ability, an understanding of specific employer business, a capacity to work in a range of cultural, ethnic, and global environments, and that new employees have sufficient confidence and skills to 'hit the ground from day one'. In regard to the last point, work-integrated learning (WIL) programs have become increasingly important in addressing employer and business demands for graduate employability development (Jackson, 2013).

WIL programs have a considerable history in providing students with meaningful work-based learning opportunities over a broad range of scientific disciplines (Reeders, 2000), and through such interactions, have enabled them to apply, further develop and refine their discipline-specific skills (Franks & Blomqvist, 2004; Papakonstantinou, Charlton-Robb, Reina, & Rayner, 2013). Effective WIL programs or their equivalent (e.g., internships, cadetships or placements) have been shown to enhance the preparedness of participants for post-degree work (Patrick, Peach, Pocknee, Webb, Fletcher, & Pretto, 2008; Peach & Gamble, 2011;

[1] Corresponding author: Gerry Rayner, gerry.rayner@monash.edu

Reddan & Rauchle, 2012). Interestingly, the recent upscaling of WIL programs appears to have occurred in well-established, research-intensive universities (Patrick et al., 2008), which may have previously distanced themselves from such initiatives. This may possibly have been due to perceptions of WIL as being less academic, or more strongly associated with vocational and educational training programs in Australia (Bradley, Noonan, Nugent, & Scales, 2008) or elsewhere (Agrawal, 2013). Nonetheless, Patrick et al. (2008) have provided recommendations on how undergraduate degrees should best prepare students for WIL and generate graduates who are career-ready.

From the employer perspective, the value of WIL programs may vary depending on the nature and size of their enterprise, together with other factors such as their 'for-profit', NGO or governmental agency status. Certainly, employers see considerable value in WIL programs that provide students with workplace experience and enhancement of work-related skills, prior to their graduation (Patrick et al., 2008). There are a number of pedagogical approaches used by WIL practitioners for student learning and the effective integration of academic-workplace knowledge (Coll et al., 2009). These approaches, which are based on the rationale that student skills be matched to employer and workplace needs, use integrated methods to employ or develop pedagogies that foster learning and retain knowledge (Coll et al., 2011). Integrated approaches are crucial for effective science-based WIL, which often requires technical and analytical skills associated with the use of particular methods or specialized equipment (Papakonstantinou et al., 2013). Ultimately, such initiatives should improve the employability or 'work readiness' of students, which is a primary aim of most WIL programs (Freudenberg, Brimble, & Vyvyan, 2010).

Due to issues such as maintaining a good grade point average, many students may now be spending more time on study and less in the workforce gaining suitable skills, or establishing a suitable workplace 'mindset' (Brint & Cantwell, 2010). If correct, this may mean that more senior undergraduates may be less inclined to engage in work that is contextually related to their degree course, with concomitant impacts on their generic skills development and workplace readiness. This is despite the value placed on workplace thinking and learning skills (Chipman, Segal, & Glaser, 2013) with more knowledge, more teaching, and greater focus on knowledge acquisition and skills development being promoted. To some degree, this problem might be compounded by the massification of higher education, with further pressures being placed on learning and teaching programs (Welch, 2012), in particular more costly laboratory and field-based teaching (Jervis, 1999). It is also possible that the discipline-focused research of most academics (Ramaley, 2013), themselves the product of an undergraduate-postgraduate-postdoctoral pathway, may mean that they have less career experience or a more limited worldly perspective (Prosser, Martin, Trigwell, Ramsden, & Middleton, 2008). Research-focused academics would thus be less able to articulate the optimal skill set needed by the majority of students who do not embark on such a career trajectory. On a related theme, Zegwaard and McCurdy (2014) demonstrated WIL can positively motivate undergraduates to proceed with graduate and postgraduate studies, in part through career clarification and generating realistic perspectives of employment prospects.

This study, which builds upon earlier reporting by Papakonstantinou et al. (2013) of the Science Student Industry Research Placement Program (SSIRPP), set out to investigate the following questions. Firstly, after at least six months post-completion of their WIL placement, had participants' perspectives changed in terms of its value and connectedness to their

learning? Secondly, as these students more closely approached completion of their studies, how did they value the placement in terms of their employability and/or workplace readiness? The findings related to these two questions were then integrated with the proposed establishment of a work skills development (WSD) program, to better prepare students for future WIL placements.

METHODOLOGY

This study comprised two parts: (i) an immediate post-placement survey of SSIRPP students who had undertaken a research-oriented WIL experience, and (ii) a follow-up survey six or more months after the initial survey. The structure and methodology for the initial survey was that used and reported by Papakonstantinou et al. (2013). This paper draws on the most recent data obtained as an extension to that study, in addition to the follow-up volunteer-response survey of the same students. The follow-up survey (Table 1) was emailed by the program coordinator to 45 students, from which 42 (93.3%) responses were obtained. The very high rate of student responses was likely due to a combination of ongoing communication between the program coordinator and participants, and the high value that students placed on the program. Students answered a series of 'Learning' and 'Career' related questions designated L1-L3 and C1-C4 respectively, using a five-point Likert scale (Likert, 1932). These questions were designed to investigate the relatedness of student learning in their degree to their particular placement, and the relatedness of the WIL experience to their future career aspirations (Figure 1). Students were also invited to make comments about the program via the following question "Any other thoughts/ideas to add about your SSIRPP experience?"

TABLE 1: Structure of the follow-up (six months or longer) survey of student perceptions of their WIL placement.

Question category	**Question**	
Learning	L1:	My degree had prepared me for the tasks I performed during the placement
	L2:	I was able to apply knowledge gained from my degree during the placement
	L3:	The tasks I performed during the placement were relevant to my degree
Career	C1:	I gained knowledge during my placement I feel will be/was relevant to my future employment
	C2:	I gained insight of the industry by working alongside other professionals
	C3:	My participation in the SSIRPP has enhanced my employability
	C4:	I was better prepared for a professional work environment by doing the placement than if I had not done it

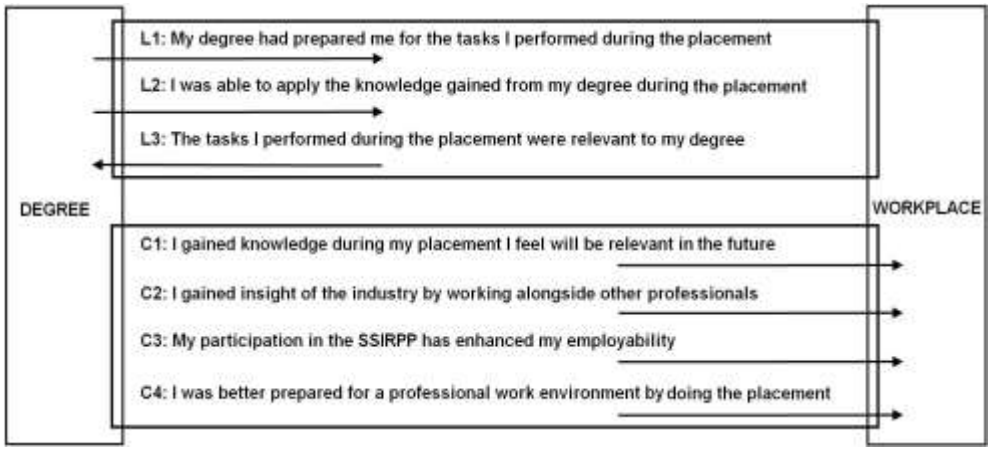

FIGURE 1: Model of the relatedness of undergraduate student learning in their degree to the placement (Questions L1-L3), and the relatedness of the WIL experience to their future career aspirations (Questions C1-C4).

Of the students (23 male, 19 female) who responded to the follow-up survey, 25 had undertaken full-time placements and 17 had undertaken part-time placements. In addition, 21 students (50%) were still enrolled in their undergraduate degree and 15 (36%) were undertaking an Honours capstone, with the remaining six (14%) in various other circumstances (Table 2). With regard to the elapsed time between completion of their placement and the follow-up survey, 12% of students were six months post-placement; 31% between six and nine months; 38% between ten and twelve months; and 19% were longer than twelve months post-placement. Qualitative data relating to students' personal comments from the follow-up survey were analyzed using an iterative coding process supported through the use of NVivo10 software, as previously described (Papakonstantinou et al., 2013). Note that due to the small sample size, the results described herein are specific to this cohort of WIL students, and interpretations can only be more confidently made through further evaluation and/or observation. The survey was carried out under the auspices of Monash University Human Ethics number CF14/1703 - 2014000840.

TABLE 2: Demographics of SSIRPP students at least six or more months post their WIL placement (n=42).

Status	**% of total students**
Undergraduate	50.0
Honours	35.7
Masters	4.8
Graduate Diploma	2.4
Time off	2.4
Unemployed	4.8

RESEARCH FINDINGS

Student Perspectives on Learning / Degree Relatedness of the Placement

Both immediately after their placement and at least six months further on, SSIRPP students were generally positive about their degree preparing them for their placement task (L1) as 74% of students agreed or strongly agreed with this question immediately post-placement. While this value rose to 79% six or more months post-placement, this increase is not statistically significant. Contrastingly, students strongly endorsed their degree studies in providing a high level of knowledge relevant to the placement tasks (L2): 88% agreed or strongly agreed in both surveys. Additionally, students initially strongly endorsed the relevance of the placement tasks to their degree (L3): 93% agreed or strongly agreed, and although the level of agreement declined to 86% six or more months post-placement, this decrease was not statistically significant. Examining mean values of each of these questions, immediately after completion of the placement, students' agreement with L1 was significantly lower than that for both L2 (T=1.26, p=0.007), and L3 (T=1.17, p=0.01) (Figure 2). Similarly, six months or more after completion of the placement, the mean level of agreement for L1 was significantly lower than that for L2 (T=1.14, p=0.01) and L3 (T=1.17, p=0.01), respectively (Figure 2).

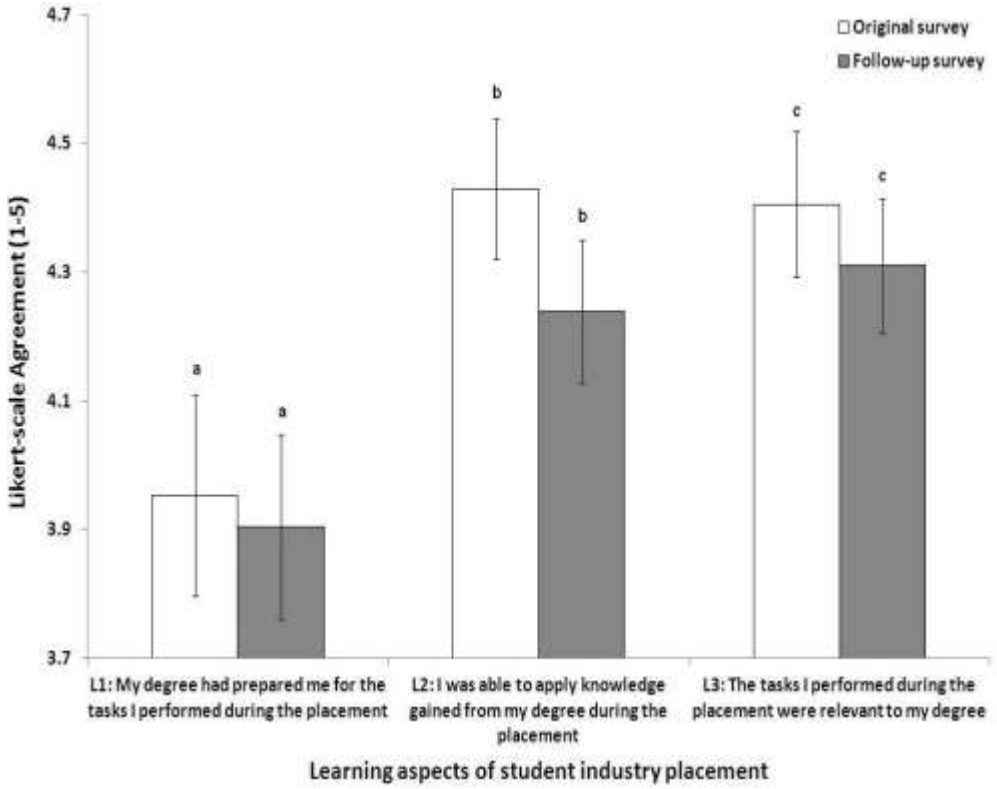

FIGURE 2: Undergraduate student perspectives on relatedness of the learning in their degree to the placement, both immediately after the placement (white columns) and at least six months post-placement (shaded columns) (n=42; shared alphabet letters indicates non-significant differences between means)

Student Perspectives on the Career-Relatedness of the Placement

Six or more months after completion of the placement, students had significantly downplayed the value of the WIL experience with respect to the knowledge gained being relevant to their future careers (C1). While 93% agreed or strongly agreed with the question immediately post-placement, there was a significant decline in the level of agreement (T=1.66, p=0.004) to 83% six or more months later (Figure 3). Contrastingly, students responded that they had gained insight into their chosen industry/placement field by working alongside professional scientists (C2), with 91% agreeing or strongly agreeing with this question immediately post-placement, with only a slight decline to 88% six or more months later. Six or more months after their placement, students mostly agreed that their WIL experience had enhanced their employability (C3): 71% agreed or strongly agreed in the follow-up survey. The majority of students felt they were better prepared for a professional work environment as a consequence of undertaking the placement (C4): 81% agreed or strongly agreed with this question, six or more months after their placement.

Students' level of agreement with C1 was not significantly different to that for C2, both immediately after completion of the placement and six or more months later on (Figure 3). There is no data for questions C3 and C4 immediately post-placement, as these questions were only relevant to, and thus included in, the follow-up survey. Nevertheless, six or more months after completion of the WIL, the mean level of agreement for C3 was significantly lower than that for C2 (T=1.44, p=0.003) but not that for C1 and C4 (Figure 3). There was no significant difference between levels of agreement for C1 and C4 (Figure 3).

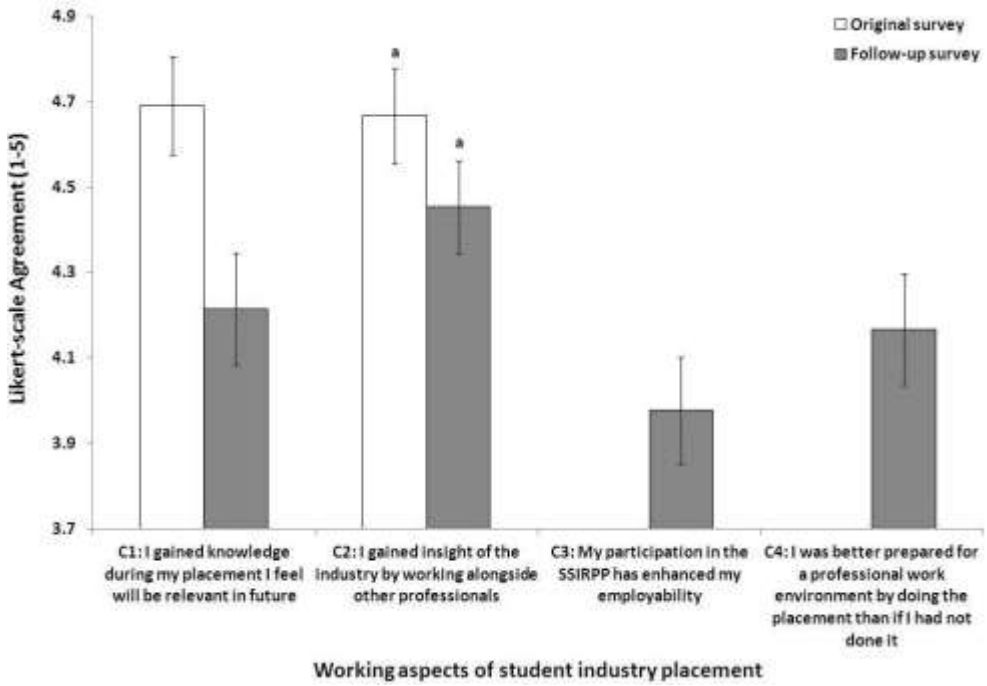

FIGURE 3: Undergraduate student perspectives on relatedness of their placement tasks to their future career aspirations, both immediately after the placement (white columns) and at least six months post-placement (shaded columns) (n=42; shared alphabet letters indicates non-significant differences between means).

Follow-Up Survey Student Comments on Their Placements

Over 90% of student comments about their placement were positive or neutral, with only a small proportion (n=5) being negative (Table 3). More than a quarter of positive student comments were general in nature, and related to the engaging, rewarding or interesting elements of the WIL experience. The most frequent positive comments were those relating to the development or application of skills as a result of the WIL (Table 3). Neutral comments mostly related to the nature of the work undertaken during the placement, or suggestions on how the SSIRPP might be improved.

Student comments related to learning issues during the placement (e.g., the disconnect between their undergraduate studies and on-the-job know-how) included, for example "The skills which form the major focus of the work performed by the lab were quite specific and inevitably had to be learnt on the job to a certain extent" (female student A). Contrastingly, other students commented on the strength of the relationship between their degree studies and the WIL. Male student B commented that "I was able to apply some of the skills I acquired in my degree on some of the tasks I was given". And one student even commented on the value of the placement for their Honours year studies, and its potential value to their later scientific career by saying "I think the work placement that I completed was useful for my Honours project, and that it may be useful experience in the future" (male student C).

A small number of students commented that the placement could have been improved if it had been longer in duration, or more widely publicized. For example male student B stated that "I think it will be a good idea to lengthen the time of the placement. While 80 hours is certainly quite long, I feel that if it was longer (say 100 hours+), it would be welcomed by most. It just gives students more time to learn and work on the project required" while another said "Recommending the program be more advertised, I know many students would want to be a part of the program but just aren't aware of the positions available" (male student D).

Finally, some students commented on their desire for the placement program (or its equivalent) to be formally integrated into their undergraduate degree, specifically in terms of academic credit: "It should definitely be integrated into university curriculum as a credit unit, it was really interesting and completely different to theoretical applications within normal university units" (male student E). Or, as another student said "I personally think that there should be a unit devoted for science students about what kind of jobs there are out on the market" (female student F).

DISCUSSION

Student Perspectives on Learning/Degree Relatedness of the Placement

The comparative lower confidence that students reported for their degree preparing them for placement tasks, compared to 'knowledge-related' elements of their degree, may reflect the fact that they are spending relatively little study time engaged in activities that promote self-confidence or provide skills that they can clearly articulate as being work or job related. In the past, such activities invariably formed the basis of laboratory and related practical activities in science (Johnstone & Al-Shuaili, 2001), including self-initiated and longer-term group activities. However, due to a number of factors, there has been a marked decline in the time that science undergraduates spend on such activities. These factors include cost, constraints on the time of casual academic staff (Ryan, Burgess, Connell, & Groen, 2013) and

their lack of suitable skills (May, Strachan, & Peetz, 2013), and the massification of higher education (Welch, 2012). Alternatively, students may have undervalued the skill sets developed during their studies: which if correct, would be consistent with findings by Dunning, Johnson, Ehrlinger, & Kruger (2003), who stated that students have difficulty in accurately self-evaluating their proficiency. This suggestion is supported to some extent by the strong endorsement by employers of student skills, as reported in our previous study (Papakonstantinou et al., 2013).

Student endorsement of their studies in providing a high level of knowledge relevant to their placement tasks suggests strong alignment between their degree major and the type of work undertaken during the placement. It also validates the not inconsiderable effort, often carried out by the WIL placement coordinator (Coll & Eames, 2000), involved in matching a suitable student with the objectives and related tasks of the industry placement. The importance of such matching has been reported previously (Gamble, Patrick, & Peach, 2010) and for specific disciplines (Sykes & Clements, 2011). However, this positive outcome should be considered with caution, given that discipline knowledge may not always be, or even perhaps expected to be, perfectly aligned with the sorts of skills required for a work placement, particularly where tasks involve the use of equipment, procedures or processes with which the student may be unfamiliar.

Student concerns about the short length of the placement are valid, and demonstrate the need for sustained periods of time in such placements, in order to further develop and reinforce skills acquired on the job and the application of higher order learning (e.g., Hejmadi, Bullock, Gould, & Lock, 2012). The short placement duration may also relate to the apparent downgrading by students, over the intervening period between surveys, of the value of the WIL experience with respect to the skills or knowledge gained during the placement. Together, these outcomes suggest that to maximize their effectiveness, WIL placements should be at least a semester or longer in duration (e.g., Gomez, Lush, & Clements, 2004). Further, WIL placements should be situated as close to graduation as possible, perhaps in the form of a capstone subject or project (e.g., Holdsworth, Watty, & Davies, 2009). Although students strongly valued the short-term research placements as part of the SSIRPP, longer-term WIL placements provide greater opportunities for students to really appreciate the workplace environment, and to enhance skills and capabilities introduced during their WIL placement (Hejmadi et al., 2012).

Student Perspectives on the Career-Relatedness of the Placement

The strong endorsement by students of the WIL placement in preparing them for professional work is noteworthy, although it should be considered with caution given the very small number of respondees who were actually in paid employment at the time the follow-up survey was undertaken. Nevertheless, the results are analogous to those reported previously, including at the university wide level (Crebert, Bates, Bell, Patrick, & Cragnolini, 2004), and for specific disciplines including accounting (Subramaniam & Freudenberg, 2007), information technology (Nagarajan, 2012), and engineering (Lock, Bullock, Gould, & Hejmadi, 2009). In contrast to these findings, Herrington & Herrington (2006) reported that the learning outcomes of undergraduates involved in WIL were inadequate for the needs of a dynamic, 21st century workforce. This is obviously an area that requires considerable further research and reporting, particularly in regard to optimizing student employment and career skills development arising from WIL programs.

Universities Should Educate, Employers Should Train

In relation to the structure of undergraduate curricula, universities have, over the past two decades, increasingly marketed their courses on the quality of students' development of generic and transferable skills - a subset of the often specified 'graduate attributes' - in addition to the inculcation of discipline-specific knowledge and understanding (Brodie & Porter, 2008). Through such marketing universities thus appear to be attempting to, on the one hand, attract high quality students, and on the other placate increasingly vocal employer and business groups (Organisation for Economic Co-operation and Development, 2004). However, it has been argued that the primary educational role of universities is not to generate 'made to fit' graduates, who are fully capable of carrying out every employment task required at the highest possible proficiency and efficiency (Boulton & Lucas, 2011). Employment after graduation should always involve elements of induction to and familiarization with the workplace environment, coupled with further professional development related specifically to the responsibilities of the position. In considering the university/higher educational role in this, perhaps the most valuable set of tools for graduates is appropriate knowledge and understanding, coupled with characteristics such as adaptability and an ability to think critically, problem solve, and communicate well in a dynamic and constantly-changing environment (Coll & Zegwaard, 2006).

Promoting a Work-Skills Development Module Series

For WIL programs that place students over an entire semester or year, upon approaching completion of their degrees, an argument could be made that higher education institutions have an obligation to better prepare such students for WIL. Such preparation, which would also have the benefit of enhancing students' career readiness, might comprise a series of workshops or modules, each focused on an element of work or career preparedness. One example of this is reported by Atkinson, Rizzetti, and Smith (2005), who developed a suite of online modules to support university students undertaking a year-long work placement as a structured part of their studies. In a related study, Reddan and Rauchle (2012) reported a number of positive outcomes for Exercise Science undergraduates when career education workshops were synchronized with their WIL program. A supplemental approach to better integrate career development into students' undergraduate studies may be achieved through use of targeted mentoring, which has been shown to enhance career training and development (Hunt & Michael, 1983). Greater student preparedness for WIL would also go part of the way in addressing concerns about exploitation of interns and other students on industry placements (Commonwealth Numbered Acts, 2009). Key considerations regarding the development and introduction of a WSD program include logistics, content (focus and balance), scheduling (in already crowded curricula), evaluation, and refinement (Bandaranaike & Willison, 2010).

CONCLUSIONS

The provision of WIL is useful to undergraduates in terms of non-academic learning and career development, particularly when such programs are structured to enable sufficient opportunities for student involvement, along with accurate evaluation of their value and effectiveness. Both immediately after their placement and at least six months further on, SSIRPP students did not overwhelmingly endorse their degree in sufficiently preparing them for the WIL. However, students very strongly endorsed the other two assessed learning aspects. In addition, students felt that the WIL experience better prepared them for a

professional work environment, and that they had gained excellent insights into their chosen WIL industry through working alongside professionals in their field. However, the cohort was concerned about their employability and significantly downgraded their initial impressions of the value of the WIL, with respect to the knowledge gained being relevant to their future careers. In summary, science undergraduates need better preparation for WIL programs, through inculcation of a more grounded understanding of the purpose of a university education, and importantly, through the design and implementation of a work skills development program to maximize the longer term effectiveness of their WIL placement.

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