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Overview of a national study on the integration of knowledge in New Zealand work-integrated learning programs

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INTRODUCTION

Work-integrated learning (WIL) or cooperative education is a strategy in which students undergo conventional academic learning, mostly at a higher education institution (HEI), and combine this learning with some time spent in a workplace relevant to their program of study and career aims (Houshmand & Papadakis, n.d.). WIL goes under a number of names internationally. In the United Kingdom this term is the well-established *sandwich degree* (Ward & Jefferies, 2004), but in the USA and worldwide *cooperative education* and *internships* are more common terms (Groenewald, 2004; Sovilla & Varty, 2004; Walters, 1947). Recently the world body for cooperative education - the World Association for Cooperative Education (WACE) added a by-line to its name – *work-integrated learning* to reflect a broader perspective of the nature of WIL, that can include capstone programs, internships, sandwich degrees, and work-based learning via industry-projects (Franks & Blomqvist, 2004).

Although work-integrated learning has been in formal operation for over 100 years (Houshmand & Papadakis, n.d) it has waxed and waned somewhat in terms of political status. It went through massive worldwide expansion lead by the USA (Sovilla & Varty, 2004), but this expansion was more about income generation for HEI than about enhancing learning. The expansion was followed by contraction, and in more recent times WIL seems to be in a second growth phase. This latter growth is related to perceptions of shortages in labor for particular areas such as engineering, and information and communications technology (ICT) (Houshmand & Papadakis, n.d.).

STATEMENT OF PURPOSE

The purpose of the present work was to better understand if integration of knowledge occurred in WIL programs, and if so, what pedagogies are reported to bring about this integration.

LITERATURE REVIEW

Reported Benefits of Work-Integrated Learning

There have been numerous studies showing that WIL programs of study provide important benefits for *students* (Dressler & Keeling, 2004), *employers* (Braunstein & Loken, 2004) and *higher education institutions* (Weisz & Chapman, 2004). A key purpose of work-integrated learning is the notion of providing graduates with a comprehensive skill set desired by potential employers. The literature notes that it is problematic for higher education providers to provide students with such skills, especially behavioral skills; the so-called soft skills (Burchell, Hodges & Rainsbury, 2000; Coll & Zegwaard, 2006). So, for example, it has been reported that compared with conventional graduates, students who participate in WIL programs gain employment more easily, fit in better in the workplace, advance more rapidly in their careers (Dressler & Keeling, 2004). Likewise, Braunstein and Loken's (2004) report of a survey of studies about *employer* experiences of WIL/cooperative education revealed there are more studies of employer *perceptions* than research-based studies of employer *benefits* of cooperative education. However, there is an overlap of the overall findings. Both types of studies identify approximately 10 areas as being those most often mentioned by employers as *reasons for participating* in WIL/cooperative education. These areas include: (a) company image, (b) recruiting, (c) savings in time and dollars, (d) employee productivity, (e) cost in time and dollars, (f) retention rate, (g) position level, (h) career advancement, (i) affirmative action, and (j) new ideas (Hurd & Hendy, 1997). Similarly, Weisz and

Chapman (2004) summarize the main benefits WIL is reported to accrue in the case of HEI. These are: student recruitment and enrolments; enhancement of student qualities in relation to the institution (i.e., self-esteem, academic performance); curriculum development (i.e., curriculum relevant to employer needs, skill development in students); the internationalization of the institution (i.e., through educational exchange of WIL students international reputation is enhanced); staff development (i.e., staff motivated and funded to do industry-based research and consultancies as result of enhanced industry contact); and financial benefits (via links with industry).

In summary, the benefits reported for all three stakeholder cohorts are mostly pragmatic or operational in nature; but it seems little is known about student learning – how this learning occurs and how it might better be facilitated or supported.

Work-Integrated Learning and Learning

Eames (2003a) notes that whilst there is a rich literature on the success of WIL programs, such research is almost entirely concerned with what he terms '*operational outcomes*'. He also notes there is a serious paucity of research into what WIL students *learn*, how they learn, and from whom they learn (Eames & Bell, 2005). This gap is consistent with criticism by Ricks and co-workers who lamented the situation in the 1980s, saying much research into WIL lacks a theoretical basis or links to theory, even when ostensibly investigating educational outcomes (Ricks et al., 1990). Recent commentary by Bartkus and Stull (2004) suggests little has changed.

WIL practitioners (i.e., those charged with the operational management of WIL programs) and researchers in recent years have strived to develop a theoretical basis to the *educational* aspect of WIL (Apostolides & Looye, 1997a,b; Van Gyn, Cutt, Loken & Ricks, 1997; Wilson, 1997). Recent progress has been made and Eames's work in particular has significantly advanced our understanding of how, and what, students learn (Eames, 2003a, Eames & Bell, 2005). The emphasis that these views place on social context permit an understanding of learning as a social process, in which students engage in learning through being situated in a community of practice on placement. According to Eames and Bell (2005), a sociocultural view of learning distinguishes the university setting from the work place in ways that allow an acknowledgement of learning in each setting that is different but complementary. Hence, the learning that occurs in the workplace is seen to occur through "the mediation of instruction, participation, and scaffolding through the use of language, instruments, stories and other tools that constitute the everyday practice of the workplace" (p. 166).

Eames and Bell (2005) conclude that WIL work placements are valuable learning strategies but note that for this learning to occur in a measured fashion, placement practitioners must design programs and placement structures that encourage learning as a situated, participatory and socially-mediated activity, and focus on assessing of learning outcomes consistent with such a view. Of particular relevance to the present work, Eames and Bell further comment that "students in such programs in science must be orientated to the potential of the placement to *complement* their classroom learning in contributing to their understanding of what it means to practice in science [emphasis added]" (p. 166).

Haigh (2008) comments on an interesting aspect of WIL workplace learning which he distils into two types of knowledge; peoples' public general knowledge (PGK), and their personal practical knowledge (PPK). PGK is knowledge that already exists and is quite widely known. It is thus potentially accessible to everyone and is the sort of thing likely to be acquired in formal education contexts or indeed in the workplace (e.g., during inductions, and in shared documentation). Such knowledge is usually assumed to be useful to many people and in more than one situation. In contrast, PPK is a by-product of personal action and personal experiences (e.g., in a workplace). It is knowledge that has typically been reflected on, and learned from as a consequence. It is typically self-directed, and of immediate relevance to current personal circumstances. Allen and Peach (2007) observe that this type of PPK has been the intention of the teaching practicum for many years, and suggest this knowledge does in fact occur. It is worthwhile to note here, however, that teacher training, as a form of WIL, has had substantial government support and funded bureaucracy at its disposal to integrate and facilitate knowledge transfer between on- and off-campus learning (see Coll, Taylor & Grainger, 2002).

Haigh's (2008) notion of PGK and PPK fits in with modern theories of learning. Eames (2003b), for example, argues WIL should encompass a broader notion of learning that emphasizes learning as a

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social process (Salomon & Perkins, 1998), occurring within a culturally-determined community of practice (Lave, 1991). In such a view the student undergoes a cognitive apprenticeship (Brown, Collins & Duguid, 1989), where they would attempt to access the PPK of more learned individuals such as working scientists and lecturers. Such an approach to learning in WIL programs would go some way to address Allen and Peach's (2007) concerns about WIL being purely for the preparation of work-ready graduates: 'engaged scholarship that enables students to develop skills as lifelong learners', something advocated by Boud and co-workers (see, e.g., Boud, 2000, 2005; Boud & Falchikov, 2006). Haigh's notion of PPK is also consistent with the notion of distributed cognition (Brown, Collins & Duguid, 1989). Distributed cognition posits that knowledge is not resident in an individual or place, but rather it is *distributed* around an organization. As an example, in a government scientific research institute, knowledge of research and detailed scientific knowledge might be held by a scientist. The intricacies of a specific scientific instrument and its operation might, however, be held by an experienced science technician; and knowledge of occupational safety and health issues associated with the handling toxic chemicals, might be held by the institutional safety officer or in manuals or specification sheets held in the office. Hence, Eames (2003b) and Eames and Bell (2005) report that WIL students can, and do, learn from a variety of people, and utilize a variety of these Vygoskyian psychological learning tools.

Integration as Part of Work-Integrated Learning

A key aspect of WIL is the notion that it entails the *integration* of knowledge and skills gained in the HEI and in the workplace. It is the integration aspect of WIL that distinguishes it from *workplace learning* (i.e., simply what a student or employee learns whilst resident in the workplace, see Boud, 2000, 2005). By integration we mean in what way does the student take what he or she has learned into the workplace, and conversely in what way does what students learn in the workplace become related to, or incorporated into, the next phase of academic learning when he or she returns to the HEI after completing a work-placement or work experience? There is some literature on integration, although much of it is rather oblique in nature (i.e., it does not address this issue explicitly, but some findings or discussion are related to the issue). For example, there are two studies – by Van Gyn et al. (1997) and Parks (2003b) – which report that students say their WIL experiences allowed them to see how to put theories learned in the classroom into practice when in the workplace. Eames (2003b) reported similar findings –a student that learned about the theory underpinning the use of chemical instrumentation, for example, found this theory essential when trying to use and do trouble-shooting when using such instruments in the workplace on placement (Eames, 2003b).

If little is reported about taking knowledge learned at the HEI into the workplace during WIL placements, then even less seems to be known about transfer of knowledge and experiences in the opposite direction, that is, from the workplace back into the classroom. We see only a few comments in the literature, with, for example, Wong and Coll (2001) noting that a student learned the use of a discipline-specific statistical package, which was subsequently found useful upon return to the HEI.

There have been calls for more integration of on-campus and off-campus learning (e.g., Grollman & Tutschner, 2006; Stenstrom et al., 2006), and there are some reports about integration (e.g., Fink, 2001), but on closer examination these represent descriptions of current practice rather than research into the integration of classroom and WIL. A few items or topics have been identified as *likely* to be integrated as a result of WIL. These are, as might be expected, mostly generic skills such as the application of theory (Furco, 1997), increased discipline thinking (Cates & Langford, 1999; Rankin, 1984), problem-solving (Burchell, Hodges & Rainsbury, 2000), behavioral skills (Carrell & Rowe, 1994), time management (Parks, 2003), and teamwork and cooperation (Burchell et al., 2000; Weisz, 2000).

Although the research about integration of WIL is sparse, Apostolides and Looye (1997b) provide a model for integration, in their example of a resource planning program. They suggest a combination of course work (i.e., classroom or on-campus learning) and placement experiences (i.e., work-place learning) that has three stages: the early stage, the middle stage and the late stage, with student's activities and experienced pedagogies increasing in complexity with advancement through the stages.

The only other literature about the integration of WIL is based on the notion of critical reflection. Such a strategy is designed to enhance learning *per se*, rather than to foster integration directly, but detailed examination of the research on reflection indicates it fosters integration, if for no other reason than that it makes students more self-aware and helping them to engage in meta-cognition. Gray (2007), for

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example, talks of facilitation of learning of management in the workplace via critical reflection tools such as reflective metaphor, reflective journals, and critical incident analysis. Paku and Lay (2008), however, report that science and engineering WIL students exhibited limited capacity for critical reflection in spite of the direct use of such tools to drive critical reflection. Eames (2003c), as part of a larger study, examined the notion of integration between the on-campus and off-campus learning, again for science and engineering students. He reported that a large proportion of participants (some 20 out of 22) felt they were able to apply at least some of their university-learnt knowledge and/or skills in their work placements. This application is perhaps not surprising; one might well expect say a chemistry student to use chemistry knowledge during a placement in say an analytical chemistry laboratory! This integration was *subject-specific*, and there was no great evidence that students were able to carry over ideas from one domain to another. Paku and Lay (2008, p. 3) reported this transfer can occur, but only to a limited extent:

> Where students have been in placements unrelated to their field of study, they were still able to make links between theory used [in industry] and that [they were] taught at university. For example, Adam [a pseudonym] was completing a materials degree and did a placement with an electricity company. He found that the principles behind electricity theory were very similar to processing concepts such as mass balances; the equations were similar but needed different numbers, units and symbols. This reflected the student's ability to see the similarities between mass and electricity theory.

What is perhaps more surprising is that Eames (2003c) reported a high proportion of his students (17 out of 21) felt their learning on placement had influenced their learning upon returning to campus. In some cases this learning was a specific technique or use of a particular scientific instrument, but more commonly it was more generic things such as attitude, study skills/habits, timekeeping, and the like, and interestingly some insights into research: "An appreciation that things didn't always go right first time" (p. 56).

There is some mention of facilitation of the integration of on-job and off-job training in the vocational and technical training literature. For example, Hodkinson and Hodkinson (1995) mention the use of liaison officers "who were responsible for the day to day progress of trainees" (p. 214). However, it remains unclear as to what effect this facilitation had, or how it was manifest.

RESEARCH DESIGN AND METHODOLOGY

Research Design

This study was one year in duration and it employed a collective case study methodology (Bassey, 1999; Merriam, 1998). A collective case study design permits researchers to gain an in-depth understanding of the issues of interest and to explore meaning from a number of angles (Merriam, 1998), and across different educational contexts. Case studies are a very common methodological approach used in WIL research because of the highly contextualized nature of such programs (Coll & Chapman, 2000). The research thus constituted case studies from three important areas of higher education; *science and engineering*; *business and management*; and *sport*.

Research Phases

In the first phase of the research, researchers from each sector conducted a focus-group interview with a selection of WIL students from the relevant discipline about their teaching and learning experiences at both the HEI and in the workplace, and analyzed relevant documentation (i.e., course/paper outlines, graduate profiles, etc.) to provide data triangulation. A total of 30 students were interviewed (12 from science & engineering; 7 from sport; and 11 from business and management), with the interviews conducted by the authors in each of the respective sectors. The students had some co-op experience and they were thus generally senior students. In the second phase of the research, WIL practitioners — placement coordinators or university/academic supervisors —participated in interviews, which also involved initial discussion of current pedagogical strategies used to facilitate student learning in the workplace (again the interviews were conducted by the authors). A total of 22 practitioners were interviewed (8 from science & engineering; 7 from sport; and 7 from business and management); all were experienced staff. In the final phase of the research, a selection of employers of WIL students participated in interviews, which involved discussion of current pedagogical strategies used to facilitate student learning in the workplace. A total of 16 employers were interviewed (6 from science & engineering; 6 from sport; and 4 from business and management). These employers ranged in seniority,

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but all had been involved in WIL programs and several had supervised co-op students for many years. In each case the interviews and document analysis followed a proposal developed in advance of data collection. The interview protocols, available from the authors upon request, drew upon relevant literature (see above), particularly the work of Eames (2003a), and sought to describe teaching and learning experiences and approaches at both the HEI and in the workplace.

RESEARCH QUESTION

The research question for this work is:

What pedagogical approaches are used in New Zealand WIL/cooperative education programs in terms of integration of student knowledge, and what impact do these have on student learning?

This question is now interrogated for each stakeholder group in turn, viz., students, practitioners and employers, in the next three papers in this series (Bhat & Ram, 2009; Weirsma, Fleming & Martin, 2009; Paku & Lay, 2009). This is followed by a summary cross-case analysis in the final paper (Coll, 2009). In each case the participants talked about their background, described the context of the learning, discussed what they felt students learned, what they should learn and how they should learn, and finally what processes or approaches were used to help students learn.

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The integration of knowledge in New Zealand work-integrated learning programs in science and engineering

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"It's an A4 grey scale photocopy, you go out there [on placement] and do a 3D, A0 size."

BACKGROUND

There is much research in workplace learning and the positive outcomes of work integrated learning (WIL) programs for students, but there is very little on how knowledge from university learning is actually integrated to the workplace and vice versa (Coll, Eames, Paku, Lay, Ayling, Hodges, Ram, Bhat, Fleming, Ferkins, Wiersma, & Martin, 2009). This investigation is a part of an extensive study on integration of knowledge. For this paper, a cohort of science and engineering employers, practitioners (academics and cooperative education staff) and students involved in WIL were interviewed, and their perceptions of integration of knowledge in WIL programs examined. We will briefly discuss the outcomes from our analysis and look at future implications this will have for WIL programs in science and engineering.

METHODS

This investigation involved interviews with employers, practitioners and students involved in science and engineering WIL programs at the University of Waikato, Hamilton. Three focus groups and two individual interviews were conducted. All interviews were tape recorded, transcribed, and treated as confidential. The groups interviewed consisted of: *Employers' Focus Group 1* - three employers from large multinational companies involved with chemical distribution and agricultural fertilizers in the Bay of Plenty; *Employers' focus group 2* - three employers from the plastics, steel fabrication and process engineering industries located in Hamilton; *Practitioners' Focus Group 1* - three work placement coordinators involved in cooperative education at the University of Waikato with degrees in biology, the Earth sciences, and chemistry; *Practitioners' Focus Group 2* - three academics/lecturers in biochemical engineering, processing and electronics from the Department of Engineering at Waikato University; *Student Focus Group 1* - three students enrolled in mechanical engineering and materials & process engineering; and two individual interviews with students from biotechnology and biochemical engineering backgrounds. The students interviewed had all completed at least one placement (a total of two students), and in some cases the students had completed two placements (a total of three students).

RESULTS AND DISCUSSION

Students

- Learning at University

Students typically agreed that theory was best learnt at university, providing base skills that help them solve problems logically. Students also identified university as a place where social skills are developed: " You come fresh out of high school and you know, you're still that kid, but when you go to university you're sort of put in a whole different environment and you're treated like an adult and suddenly … you learn all of these life skills." Learning was seen to be facilitated by the student, peers, lecturers, and mentors, occurring in lectures and tutorials, and in laboratory sessions that were often managed by the lecturer: "Yeah combination, kind of like lecture is like your biggest look at it, the tutorial you try to work it out yourself theoretically, and the lab you see how it really works."

- Learning in the Workplace

Students identified a number of skills that they perceived they gained from the workplace. Typically practical skills were learnt. For the engineering students it was working with machinery, using computer aided programs (CAD) and understanding engineering terminology. For science students, they learnt laboratory skills and became familiar with different equipment. All the students said they

learnt the importance of communicating to and working with different people within an organization: "Also just working with other people and getting use to going to see different people and the way you if you can interact differently with an operator then you do with another engineer, and um just get use to explaining what you want in different ways." Students learnt about the company they were working for, how the company functioned, the roles of different people there, and they gained an understanding of the science and engineering industry. The students also felt they learnt a work ethic, following instructions, working to deadlines, and being dependable: "With the placement when you know you are working for someone and you have to get the results that they need on time. It sort of reinforces that you're not just doing this for yourself; you're doing it for other people as well. They have expectations."

But overall it was seeing theory in practice, which provided students with a greater understanding of what they were learning: "Definitely the hands-on, just based on like tools and things you don't get that experience here [i.e., at university]." Another student supported this saying, "because it's like at uni [university], you've got a picture of what's going on, but it's an A4 grey scale photocopy, you go out there [on placement] and do a 3D A0 size!" For one student in particular, it was his placement that made him decide to continue with his degree: "The work placement stopped me from dropping out. Because it [i.e., university] was getting pretty boring, and my placement was really interesting which is why I'm sticking at it." This type of response resonates throughout research in WIL programs as one of the many benefits of WIL programs to students (see, e.g., Dressler, & Keeling, 2004). Work placements also are reported to increase students appreciation of academic studies which facilitates learning and identifying career prospects (Eames, 2003).

In the workplace, the science students said they learned from technicians more so than supervisors: "The supervisor gave me what to do, he told me what to do and then he gave very informative pointers but when it came to skills it was always the other lab technicians because they were there longer." Students also said they learnt by asking questions, but some employed a "sink or swim" approach, for which they found that being immersed in the problem had helped them to learn quickly. They reported they learnt from people who were passionate about their work: "I think people that realize there is more to working than just cranking out your eight hours a day," and some said they learnt from older more experienced people, whereas others said they learnt from other students or people their own age. In general they said they learned most from someone they found to be knowledgeable, and approachable.

- Integration of Knowledge

The students' perception of integrating their knowledge from university to the workplace and from the workplace to university was vague. Students perceived that learning was occurring (e.g., from university to workplace or workplace to university). However, this was seen as something of a one-way learning process for most. The students rarely knew when knowledge transfer from university to workplace and vice versa was occurring; in some cases, they failed to identify what learning might have occurred, and where it had occurred (i.e., university or the workplace) - demonstrated by their difficultly to reflect on the integration of their knowledge (Lay, Paku, & Swan, 2008; Paku, & Lay, 2008) .

I think a lot of students don't realize it, they don't realize what they take back from the placement, and I think it's the same for me, I don't, but like through this interview you sort of like think, oh yeah you sort of use that from placement, and you use that from placement, and that's what you use from uni [university], but I think you realize that not all students will know

The students commented on knowledge transfer from university to workplace such as taking knowledge and applying it in industry: "It was a research project that we were doing and we would have to come up with ways to, well different methods and approaches we were looking at, we did use ideas from courses that we've done."

The students also commented on knowledge transfer from the workplace back to university, in general it was putting into place new skills learnt (e.g., CAD skills and analytical techniques). On placement, they said they got to put into practice their skills they have either learnt or brought with them from university, and in the workplace they get to use them frequently so that when they return to on-campus learning, their new techniques had become something of a habit.
For one student, it seems integration did occur. She reported that she was able to take theoretical knowledge from university, use it in her work placement, then return to university with more enhanced skills and understanding of the calculations. She now felt competent with this skill.

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I'd done in my second year papers [at university] mass and energy balances, and then in my research [work] placement we did a whole lot of that. It's reinforced in third year [at university]. So I mean you get that, things just seem easier after having done it. But I guess that's just all extra practice.

Practitioners

The practitioners perceived their program aims for students were that they provided an opportunity to gain relevant work experience, use skills learnt at university, and enhance their learning to help them establish a career focus.

- Learning at University

Practitioners think university provides students with theory and basic analytical and practical skills, and that the students learnt these skills best from laboratory classes: "Learning in lecture format is not the same as doing it yourself," and that they learn from lecturers, demonstrators, other students and textbooks.

- Learning in the Workplace

The practitioners thought their students were more likely to learn soft skills in the workplace such as communication, personal responsibility and reliability. They also hoped that students would gain an appreciation of real-life situations, and provide useful work outputs for their employers. They felt that students would develop their team working skills, project management and time management skills. Hard skills such as technical skills were expected, along with accuracy and the importance of doing things correctly:

I don't think that we teach them accuracy at university, I'm thinking of [student's] placement making surfboards. You know when they do a lab and they much it up we don't care so much, you know they lose just a grade. I mean he's making a surfboard, and he doesn't do it well he might lose that production run.

- Integration of Knowledge

Views varied between two practitioner focus groups as to what they perceived students to bring back from workplace learning. The group 1 thought students returned to university with soft and technical skills, whereas group 2 thought students would develop a work ethic, but did not think that soft skills (in particular communication skills) were something specifically improved during a placement. Both groups said the students were typically unable to demonstrate their soft skills after returning from the workplace; but this may have been because university studies did not provide opportunities for them to assess that. The practitioners thought that the reflective learning section of the placement report was the one place in which the integration of knowledge could occur, and that the student was the main facilitator of this: "Through their reports, through their reflection their review part. They actually ask themselves, What have I got out of this? How is it going to help? How is it going to help my university studies? So maybe they themselves facilitate it, for themselves."

Employers

The employers interviewed were from a variety of backgrounds within engineering and science, and human resources. Their involvement with placement students was diverse; they have had students from most universities in New Zealand, including some WIL students from Waikato. Skills and attributes that employers looked for were hard skills and basic knowledge, people skills: "Energy and good attitude," and someone that is a "team player." These employers were more focused on students that had social skills rather than excellent grades, and instead wanting a "good all-rounder."

- Learning at University

The employers see university as the place of "learning how to learn," that teaches students the basic principles, and provides them with a broad understanding of science and engineering. Students learn how to research, and they feel that university also teaches them about accountability, life skills, social skills and respect.

- Learning in the Workplace

From the workplace, employers would expect students to learn the "ins and outs" of the business and to learn a variety of hard skills and social skills. It is deemed important to learn how to be an employee,

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learn responsibility and learning to work to deadlines. Employer views of what students actually learnt on placement were different to their expectations. In general employers thought that students actually learnt soft skills such as people skills, communicating and interacting with a range of people: "Good judgment, knowing when you need help and when you can charge on yourself," and prioritizing, time management and meeting deadlines. The employers felt that students gain an appreciation for science/engineering on a large scale and an application of what they have learnt at university to real life situations.

- Integration of Knowledge

The employers did not mention integration directly during interviews, but alluded to it. Integration of work place knowledge was thought to occur via verbal communication with peers, and lecturers on their return to university.

Probably just got different experiences rather than better ones. But I think I like to think also that they come back [to university], and they start talking about challenges and things amongst the class environment or maybe with their tutor maybe if they have got some issues that they do bounce them around. Hopefully that is [em]bedding back into the process.

CONCLUSIONS AND IMPLICATIONS

All three stakeholders in science and engineering clearly identified workplace learning (as noted by Coll et al., 2009), but integration of the knowledge was not as obvious. Some of the stakeholders were vague on knowledge transfer occurring, in particular from the workplace back to the university. The practitioners, however, mentioned that the reflective learning section of the work placement report encourages students to think about knowledge integration between the workplace and university. However, as observed by the authors (and practitioners), very few students are able to make this connection on their own and often do not have a clear understanding when knowledge transfer occurred. Because students are not actively facilitating integration of knowledge, and employers' views of integration are limited, it is appropriate that practitioners within all WIL programs be the facilitator to drive knowledge integration in science and engineering. Knowledge integration can be encouraged at different stages within the WIL process, (before the work placement, during and after) to maximize the full potential of the knowledge transfer. These findings have provided us with suggestions to our current practice and ideas that we will look at implementing into our WIL program.

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The integration of knowledge in New Zealand work-integrated learning programs in sport

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INTRODUCTION

The use of reflective tools and processes to contribute to the learning of managers has been promoted in the management literature. However, whilst the potential of these tools has been highlighted, further empirical research as to the efficacy of such tools and processes in the management field has been advocated (Gray, 2007). The paper which forms part of a national study of the integration of knowledge in WIL programs, reports the findings of a case study (Yin, 2003), which investigated what pedagogical approaches are used in work integrated learning (WIL) sport and recreation programs, within selected New Zealand universities, in terms of facilitating and integrating student learning, and considered the impact these have on student learning.

CONTEXT AND METHOD

This case study combined analysis of two university cohorts of three focus group interviews with the stakeholders (students, lecturers, and industry supervisors) involved in maximizing WIL opportunities. One cohort was from a three-year Bachelor of Sport and Recreation (BSR), with majors in Outdoor Education, Physical Activity & Nutrition, and Exercise Science, at AUT University, Auckland, New Zealand. The second cohort was drawn from a three-year Bachelor of Business Studies (Sport Business Management) or Bachelor of Sport and Exercise (Management & Coaching) from Massey, University, Palmerston North, New Zealand. As part of the WIL experience of both cohorts the students had to complete a project that would be beneficial for a sport or recreation organization (Fleming & Martin, 2007). The credibility and dependability of the research was enhanced by triangulating the data across both cohorts and the three stakeholder groups plus relevant documentation (e.g., course/paper outlines, graduate profiles, etc.) and literature (Stake, 2008; Yin, 2003). The reporting of the descriptive responses in the case study attempts to convey the holistic understanding and meaning of the phenomena under study (Merriam, 1998).

RESULTS AND DISCUSSION

The main pedagogical approaches used were:

- Students – reflective journals/ assignments, lectures/ workshops, group discussion, academic and industry supervisor feedback;
- Academic supervisors – practical case studies, models, frameworks, problem solving, class discussion; and
- Employers – employee focus, HRM practices, undertaking a range of tasks;

Key themes related to student learning were:

- Self-confidence and communications skills;
- Initiative and personal planning, and organizational skills;
- Industry and business knowledge and customer service management; and
- Professional networks and professional ethics.

Students

The sport students felt that the aims of the WIL experience, consistent with the course descriptions, were to "take what we learnt at uni and all the theories and all the classes and put into practice." The WIL experience was seen as "more than just developing skills but developing an understanding of the importance of them in an industry context." This, it seemed varied depending on where the learning occurred:

I did learn a lot of things before co-op [i.e., WIL] and during co-op. I was able to put them into practice and while I was putting them into practice new things came up. It's hard to separate them and say this was before and this was during and this was in the classroom or this was in co-op.

While you are sitting there in lectures and you are learning what you are learning but you don't know what it is you need to know. When you go into your [WIL experience] then you learn what you need to learn. You don't realize the value of the information you are given until you get there.

Students reported that they had experienced the traditional pedagogies of lectures and workshops on campus. Sociocultural aspects were also important in student learning in the classroom as well as the workplace (see, e.g., Eames, 2003; Fleming & Eames, 2005):

Social interaction inside the classroom is kinda easy way to learn as you kinda draw on the ideas of others.

The classes seem to be more group-oriented with people having group support … It was kind of a good opportunity for classmates to discuss what was going on in each other's [projects] and provide support for problems or issues.

Being in that kind of environment [i.e., placement] you have the opportunity to use all the people around you to learn well so you have got someone to bounce ideas off or get a piggy-back from.

The students felt that supervisors (both academic and industry) were important in facilitating the integration of learning: "You, as the student need to make sure that both industry and academic supervisors are there for you." However, the student needs to have the most significant role: "The student needs to be in the driver's seat like in quite a strong way. You don't know what you are going to be doing until you start getting into it." Reflective journals and assignments helped develop the capacity for metacognition, but students felt integration of on- and off-campus learning could be better facilitated by their academic supervisors, but that this should also be student-driven.

Sport students felt they learned a range of content and basic skills on campus and subsequently developed their soft skills and a sense of professionalism on placement:

You need a certain amount of skill so that you are of use … you need a foundation and then you can build on it when you are there.

It wasn't necessarily the sport specific subjects that you could take into your [WIL experience] but it was more the theories that you learnt from the core papers - the underlying foundation kinda stuff.

When returning to university, it was felt that these soft skills were able to be transferred back into the classroom learning environment:

I took back fluency of communication, written communication skills I can use in my future assignments, time management and organization.

You have more respect for organizations as now you know what they do. The real life examples help. You can then apply what you are learning back on campus to the experiences you have had.

It was felt that there needed to be some understanding by the industry as to what knowledge the students had prior to entering the WIL experience. Expectations as to what the students could do needed to be clear but there still needed to be flexibility so "students did not miss an opportunity to do something that is a great learning experience."

Academic Supervisors

Academic supervisors felt students learn how to apply or transfer knowledge gained on campus into the workplace setting, and that the main purpose of WIL was to enhance careers. There was a focus on the development of graduate competencies. Hard skills focus is one specific content area (e.g., event management), whereas soft skills are related particularly to developing aspects of communication (e.g., verbal & written skills). Whilst academic supervisors saw integration as important they did not feel students were particularly capable at this. They felt the on-campus learning activities (lectures, tutorials, seminars) were very practically-oriented, and saw the reflective journals as a key learning tool in terms of integration. Assignments are focused on developing critical reflection skills. The reflective journal in particular is "an integral part of our assessment," undertaken throughout the learning process: "I like to say that what the students learn is how to think critically and in the kind of world that we live in now where theories are changing … there's so much information."

Academic supervisors reported that they often provide models or frameworks for students to reflect on during practical situations, for example, working through and problem-solving real scenarios, delivering a lecture on theoretical concepts, or presenting on their WIL experiences. Inviting staff and graduates from the sport industry to talk about their experiences in classes is another way academic

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staff sought to link theory to practice. Theoretical classes lead or stair case towards the capstone WIL project involving the placement organizations (Martin & Leberman, 2005): "It's seen as a part of a whole course of study; it's like the culmination of what's happened."

The experiences from the placement are discussed and reflected upon back on campus. This opportunity was felt to be particularly valuable with this cycle of 'reflection-on-action' (Schön, 1991) being able to be repeated:

That's where the most learning happens is when they come back. 'Cos they don't have time to reflect when they're out in the work environment often, so this on campus provides them with this opportunity.

You put them into less threatening situations and give them some context before they get into that environment. And then you can come back and reinforce that reflection of those things that did matter and it's easy to pick up on the little bits of pieces that you may have not guided them in.

Employers

Employers saw students coming to placements with a range of skills and abilities but with basic content knowledge. Employers saw their own role as exposing students to a wide range of tasks and activities. They tried to facilitate learning by treating students much the same as other new employees, and felt they learned soft skills such as self-confidence and communications skills, as well as multi-tasking, prioritizing and time management along with an understanding of workplace culture. Most of the employers were not familiar with what pedagogies are used on campus, but reported that approaches used to help students learn on placement consisted primarily of exposing students to a wide range of tasks and activities and, in some cases, letting a student experience a full planning process from start to finish:

I made sure last year, for example, I had [a student] go through the whole, the whole action plan of the event so from … pre-event to post event. And then also setting the budgets and things like that, so, they were involved from the beginning of a process of the event.

Empowering them as an employee and giving them the opportunity to take charge of something, making mistakes, learn from that.

Students were also included in weekly meetings and workshops being offered, and were exposed to some form of induction and/or training as would occur with any new employee. In some cases a detailed job description was provided to the student. Ongoing supervision and regular progress meetings were also mentioned as approaches used to help students learn while on placement. Several employers provided formal performance evaluations for their students as they did with full time staff. Applying these human resource management processes for volunteers was also advocated by Cuskelly and Auld (2006).

The employers reported that key learning outcomes related to a better understanding of what really goes on in a job (i.e., how an organization functions and the culture of the organization - a reality check). The student's ability to undertake a task successfully at the end of a placement was an indication of their learning, but also came from the fact that they were able to complete tasks satisfactorily: "Can they when left to their own or asked to complete a task that you've shown them or have learnt through exposure, can they get in there and do the job that you asked them to do?"

The employers felt that students learn a variety of both soft and hard skills from on- and off-campus learning experiences and that these two complemented and reinforced each other:

Life skills you learn them at work and at uni … it's one of those things it doesn't matter where you are learning them.

Rather than learnt, perhaps there is a crossover between the both in terms of embellishment of what's already been taken on board if you like, so each is supporting the other, in other words, the computer skills and the hard skills and the research skills and so forth that they have learnt here will be embellished and further practiced and refined whatever applied to the knowledge … it's a two way process.

Overall, all of the employers felt that the WIL experience gave students an advantage over others for future job prospects based on the wide range of experiences and networking opportunities provided:

The experience they've gained, the people they've worked with, the knowledge they've gained, I mean they have to recognize that as a launching platform ahead of others that haven't done that sort of thing.

CONCLUSION AND IMPLICATIONS

The findings from the sport context indicate that integration and learning is fostered principally by reflection-*on*-action (Schön, 1991) involving reflective journals, and assignments/reports post-placement.

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Students commented that there was an expectation that there would be some degree of integration of on-campus learning on placement, although academic supervisors acknowledged that the degree of integration of theory and practice was variable and depended on the level of critical reflection. From an employer's perspective it depended on the type of organization and work activities the student was involved with as well as the knowledge that the student had prior to entering the WIL experience. Overall more direct attempts from all three stakeholders to integrate on- and off-campus learning are required (i.e., integration/reflection workshops, industry guest speakers, industry supervisors' training, etc.) to maximize the potential of WIL experiences and enhance sport graduates competencies and employability.

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The integration of knowledge in New Zealand work-integrated learning programs in business and management

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INTRODUCTION

This is one of the papers of a multiple paper set based on a Teaching and Learning Research Initiative (TLRI) project that was completed by a team of researchers. The focus of this paper is students enrolled a work-integrated learning WIL program, the Bachelor of Business (BBus), at Unitec. According to Houshmand and Papadakis (n.d.), WIL is an educational strategy in which students undergo conventional academic learning at a higher educational institution (HEI), and combine this with some time spent in a workplace relevant to their program of study and career aims. However, Eames and Bell (2005) observe that very little research has been done on what WIL students learn, how they learn, and whom they learn from. Grollman and Tutschner (2006) and Stenstrom et al. (2006) have called for more integration of on-campus and off-campus learning, and Fink (2001) has pointed out that there are some reports on integration. The TLRI project has tried to address this shortage of research on learning as well as the integration of knowledge that is facilitated by WIL.

BACKGROUND

The BBus degree at Unitec has the following majors: Accountancy, Finance, Information Systems, Management, and Marketing. Industry Based Learning (IBL) is a compulsory course at Level 7 for each of the majors of the degree. As the number of students on the program is large, an IBL Coordinator takes up the responsibility of student placements in the industry. Employers in the local industry actively support the course by providing opportunities for work placements to Unitec students. In this context the three stakeholders of the course (Unitec, the student, and the host employer) derive mutual benefits from the work placement. Accordingly, the views of the three stakeholder groups were important to this research project, the aim of which was to understand how each stakeholder of IBL contributes to a Unitec BBus student's integration of knowledge through work placement in the industry.

CONTEXT AND METHOD

The members of the research team at Unitec adopted the research approach of the TLRI Project Team Coll, Fleming and Hodges (2009). It involved the gathering of stakeholder views involving two main data sources — interviews with the three stakeholder groups (namely students, academics, and employers) and analyses of relevant documentation. The academics interviewed included the IBL coordinator and academic supervisors. The interview protocols drew upon relevant literature (see above), particularly the work of Eames (2003a), and sought to describe teaching and learning experiences and approaches at both Unitec and in the workplace. All interviews were recorded using a data recorder that facilitated the transcribing and subsequent analysis. Further details of this and other aspects of the research approach are outlined by Coll et al. (2009).

RESULTS AND DISCUSSION

Students

Full-time as well as part-time students enrolled in the BBus program were interviewed either individually or in focus groups. Although the program aims and course learning outcomes are well documented, apparently, the fulltime students had only a vague idea of the program aims prior to going on placement:

> I think that it's about the whole experience like you get to meet new people and then you get to deal with them, like if there's any issues you got to deal with them rather than just being with people you always know, and that's easy, so like being in the work environment, you get to meet new people you get to be in new situations and you just gotta learn, you learn from your experiences.

A part-time mature student, however, saw the work placement as a way of challenging himself to perform in the work place:

One of the key things would be to challenge myself that I actually, well challenge myself with what I've learnt and bring it into the business that I was working for. And, also prove to myself that I am more than capable, as well as it was just a good summarize type course where you put everything from all the different subjects together and then manage to use it in a real life environment.

Students indicated that on-campus they learned theoretical concepts from their lecturers and classmates:

Well I think I have learnt a lot from the lecture because the lecturers enlarge our knowledge, they will talk about something in their life or in their industry … Yeah I agree with her. They got lots of knowledge you have to learn from the lecturer first. And some people got experience, but some basic knowledge you have to learn from the lecturer.

Soft skills, especially communication skills, were best learned on placement:

Yes, communication is very important especially clarifying things, sometimes they just give you things to do and you have to go and ask them and you have to be good at listening because they expect you to know everything.

Importance of communication within the organization was also noted:

The best things [learned on placement] probably the type of communication required in the business environment, or acceptable communication. With a marketing degree, like product knowledge and things like that, so the product that fits the organization, yeah so obviously you have to learn through the organization (what) you can't through [the HEI] that goes back to me saying there's students that just do assignments that's not real, 'cos you can just pull off a of a product off the Internet. Yeah, so [learning], is best within the organization.

Most of the students thought that they learnt a lot form the host supervisor: "Well I learned a lot from the host [my supervisor], she is very good person and she is very professional in this industry, and her writing [skills] is very good." However, other staff at the placement site also contributed to students' learning: "I mainly learn from my manager because he pretty much does, he's pretty much "the company", like I've learned some from the other staff as in depending on what they do, but yeah mainly the manager." Students expected that they would use in their placement what they had learned on campus: "Yeah like, some basic knowledge how to do [analyze] the financial performance and position is quite useful in the real life, you have to do all of this for your clients." While the students thought that they would be using their knowledge and skills learned on campus in their placements they were also aware of ethics in the work environment: "Ethics that sort of thing, communication, all those things we did in business communication course, things that you are learning in both environments."

As IBL is just one of the courses of the BBus degree and can be undertaken as soon as required pre-requisites have been met, the students expected that they would be able to integrate what they learned on placements into their learning in the classroom:

Yeah especially taxation, yeah I never learned this before even in diploma, but you know when I first come into the company, the accountant just asked me what is the [difference between] resident and … tax resident, I told her no idea, so I just learned some basic knowledge then I come back [and bring it] to the class

Placements also provided the students with opportunities for reflection and integration: "Some key things that I picked up were reflecting on the day and I tend to start doing that more, you know understanding what is actually going on around you." Reflection and integration are required by the portfolio method of assessing learning and students appreciate the value of this assessment tool: "Well I do think it is very, very helpful to do the portfolio because as you see I wasn't sure how much I had achieved … see the progress I made."

Collaborative assessment at the end of the placement proved another opportunity for all the three stakeholders to come together and contribute to the student's learning: "By the time you got to the collaborative assessment there were no surprises because we'd kinda covered [everything], we were checking things off as we went and I had a plan."

Practitioners

The practitioners who were interviewed included an IBL coordinator and academic supervisors. To facilitate the students' understanding of the requirements of IBL, the Coordinator ran four workshops. The coordinator emphasized the value of learning journals in their own right and also as a part of the portfolio: "The critical reflection process is probably the singularly most valuable aspect of the IBL. Having people analyze and reflect on incidents that have occurred that week … describe it, analyze it and say what they might change the next time they encountered it."

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According to the coordinator a learning portfolio provided evidence of what the student had actually learned on placement: "I see the portfolio almost as a communication exercise because they have to select [using] critical thinking, they have to select appropriate evidence."
The academic supervisors agreed with the view that IBL prepared students to enter workforce: "I think this learning really opens eyes of the students as to what the real work environment is like. Especially for those students who have never been in the work environment before." The learning journals were seen as effective in the personal development of students: "I think, a lot of the learning they are getting out there, it is more personal, it comes from their reflective journals learning what, [for example] "oh hang on I've thought I was good at that but I'm not." The importance of collaborative assessment meetings was also observed: "You really understand when you see them interacting in the workplace with the supervisor and the things that they say about themselves, the way they put across their own comments in the assessment."

The academic supervisors also felt that students learned from being in informal situations in their placements, such tea breaks: "They might find in the social environment at lunchtime, at tea breaks, that other people are chatting, you know casual conversation, and then they suddenly realize that their skills are lacking in one of those areas." And they discovered other ways of learning as well: "A lot of it is the politics of the work place, the things that they get in IBL are the closest they will ever get to quote the real world learning because the classroom is quite closeted in that regard." Networking was seen as facilitating learning and having ongoing value: "Networking, bit of that has come up with one of my students, the value to them of meeting colleagues and being able to interact with them in the future." It was felt that the student would learn most from people who were both accessible and friendly: "The person who is most available and most friendly … they are available and those are the people the student will learn most from." The academic supervisors felt that teamwork could be learned on- and off- campus and was essential in real world, especially in New Zealand: "If people feel in industry that you are not going to fit in with the rest of their team and the rest of the colleagues they don't really care how brilliant you are." And the importance of good communication in team work could not be over emphasized: "I think the vital one is communication because … whether you are in the classroom or the work environment communication is vital and if there is a communication breakdown then we have difficulties in the system." As with teamwork time management could also be learned on- and off-campus: "We're trying instill the fact that when you have got something to do you get down and do it, and if you finish it early move onto something else," and it was absolutely essential in the workplace: "The deadlines are not just I didn't hand in my assignment on time and my grade is low, but you can have somebody in their face yelling at them, I need this and I need it now!"

Employers

The employers who were interviewed placed emphasis on communications skills of the students as well as their understanding of what they wanted to get out of their IBL placement:

> I think they need to be a bit more focused … that they are coming from a university or college environment [into a] business or an office environment, and to have a better understanding of what they are trying to achieve rather than walking in "cold". I think it's more the understanding of what they want to do I think. From what I could gather there was no clearly defined future as to what X wanted to do. He just wanted work experience and you can get work experience anywhere really.

One of the employers pointed out that students needed to understand their business and the importance of customer: "This is sales, retail sales, so they have to make a good impression … they have to look professional. [When] the customer asks [a question], they're there to respond quickly and accurately." Some of the employers tried to facilitate student learning by encouraging the student to ask questions: "I would go back and ask an open question, why do you think we should use [this], why should we reduce the price as a market entry strategy when we've got a niche market?" The employers felt that on-campus learning should prepare the student for the realities of business and what the real world was all about. One employer even felt that that classroom study was more important than learning on a work placement: "You need to have really good educational background, good foundation, much knowledge about marketing something, you can [then] relate the theory to practice." The employers felt that practical aspects of business were best learned on work placement: "Here they actually face the real business … here they actually experience how to deal with customers and they get confidence with that, and then, some sort of problems like customer complaints or customer misunderstanding like a big argument … they can't actually teach that in the class."

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CONCLUSION AND IMPLICATIONS

From the above interview data it is clear that all the three stakeholders contributed in their own ways to the student's learning while on an IBL placement. WIL students learned from a variety of people that they came in contact with while on placement as observed by Eames (2003b) and Eames and Bell (2005). While on placement the students find themselves drawing from their knowledge of different courses that they have done on campus, getting guidance from their academic supervisors and mentoring from their workplace supervisors. Integration of knowledge was facilitated by the use of pedagogical and assessments tools like learning (reflective) journals, reflective essays, collaborative assessment and learning portfolios. However, need has been felt for a personnel, e.g. a coordinator for each major, to help with the integration of knowledge of WIL student. Need for assessment tools that could measure the holistic achievement of the student while on placement have also been felt (Hodges, Hopkins, Ling, Malcolm & Yau, 2004). The sophisticated portfolio model developed by Hodges (2008) holds promises for meeting this need as it has already been trialed out at Unitec New Zealand.

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Summary of a national study on the integration of knowledge in New Zealand work-integrated learning programs

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INTRODUCTION

This paper is the final in a series of papers that comprised a multiple paper set derived from a three-sector national study of work-integrated learning. The first paper (Coll, Fleming & Hodges, 2009) backgrounds the study, and the research findings for each sector in turn are described in three other papesr (Bhat & Ram, 2009; Weirsma, Fleming & Martin, 2009; Paku & Lay, 2009). This final paper provides a cross-case analysis for the national study.

SUMMARY, CONCLUSIONS AND DISCUSSION

A review of the research findings points to some differences, but remarkable commonality across the three sectors. Here we provide an overview of the findings and discuss these findings in relation to the literature.

There seems to be strong consensus across all three sectors and each cohort of stakeholders that all three parties benefit from WIL, with most benefit accruing to students, who are seen to gain important graduate competencies/skills and career enhancement. Students are thought to pick up a repertoire of skills from WIL, mostly as a result of completing a placement, practicum or IBL project. On-campus pedagogies consist of lectures, tutorials and in the case of science and engineering, outdoor education and information systems students, practical work. The main purpose of such pedagogies is to provide basic content knowledge and theory, with practical, real world work anticipated from the off-campus work placements/practicum or project. Most programs irrespective of the WIL component see themselves as applied in nature, and some employ group work and other pedagogies to foster at least some skill development in the behavioral/soft skills area. However, the stakeholders think any real world experience comes mostly from the off-campus activities. The pedagogies employed off-campus tended to be more informal in nature than the on-campus pedagogies, and consisted of inductions and one-on-one mentoring. There is no consistent mechanism by which off-campus supervisors or mentors seek to employ or develop pedagogies to foster learning. Learning is thus by means of *legitimate peripheral participation* (Rogoff, 1995) with students off-campus acquiring knowledge by working alongside professionals in their area via an apprenticeship model of learning (Lave & Wenger, 1991; Rogoff, 1995). Skills gained in off-campus learning are mostly behavioral/soft 'people' skills such as communication, time management along with an understanding of workplace culture, treating others with respect, a good work ethic, and developing a sense of professionalism culminating in an appreciation of what it means to be a professional in their specialty area (Eames, 2003a, 2003b; Eames & Bell, 2005).

There seems to be clear recognition of *distributed cognition*, in that all stakeholders across all sectors consider that students learn in a variety of ways, from a variety of sources with knowledge resident in a variety of places across an organization (Perkins, 1997). Consistent with this observation, there also is evidence for Haigh's (2008) notion of PGK and PPK in the workplace, and it seems students from all three sectors gain PGK via books and resources in their HEIs, and via documents and formal induction in the workplace. The students also gain at least some of their mentors' PPK – derived from years of experience as professionals, via the apprenticeship model described above. This type of learning is particular to the specific education/learning context, be it the lecture hall or the workplace.
Wertsch (1991) also talks of *situated cognition* where the learning is specific to the setting (see also Lave & Wenger, 1991). For example, what the students report learning (supported by the views expressed by mentors and academics) here depends on the setting; they report learning factual material such as content in their HEI, soft skills in their workplace, and so on. However, consistent with Eames's work (see, Eames, 2003a, 2003b), the knowledge they acquire in say a marketing firm, is *specific* to that industry and that firm – the way we do things around here, the acronyms we use and so on. Hence, the teachers (be they lecturers or workplace mentors) employ a variety of Vygotskian psychological tools

(Vygostsky, 1978) such as *mediated action*, which involves, for example, the use of language specific to that educational setting and writing in a specific way (e.g., writing or speaking 'scientifically' or in a formal manner when preparing tax audits).

There is no evidence of direct *explicit* attempts to integrate on- and off-campus learning, although all parties *expected* this would occur and agreed it *should* occur. However, integration is *implicitly*, or indirectly fostered by a variety of means – more so for some sectors than others. This means the students may not develop the competency to learn. The principal means for fostering integration of on- and off-campus learning is by reflection and review, via, for example, reflective journals, and assignments/reports post-placement. This integration mostly consists of reflection-*on*-action (Schön, 1991), after the learning activities, and consists of reflection on personal growth, and incident/event deconstruction. In this sense it is similar to the activities of the teaching practicum, which strongly encourages reflection after the event (Allen & Peach, 2007).

Assessment of WIL programs, Eames and Bell (2005) say, should reflect the complexity of the dual and complementary nature of the learning environments. The assessment approaches employed here, as noted above, all incorporate elements of reflection (e.g., assignments, reflective journals, etc.) along with more conventional modes of assessment. The model proposed by Hodges (2008) certainly is sophisticated enough to address all learning outcomes revealed in this work. As Hodges notes, and as is strongly supported in this work, assessment of the workplace learning component in particular bedevils WIL programs. Complex as it may be, it seems if we wish to address the complexity of the learning that occurs in the workplace, we may well need a model that is as sophisticated as that provided by Hodges. If we do not, then we can really only say we are assessing in a piecemeal fashion.

IMPLICATIONS FOR PRACTITIONERS

It is evident from this project that despite coming under an umbrella term, *work-integrated learning*, most programs do relatively little to formally drive the integration of knowledge between the HEI and workplace and vice versa. Whilst there is some logic in suggesting the student has ultimate responsibility for his or her own learning, WIL practitioners argue they are *educators* or at least that they should be considered educators (see, e.g., Coll & Eames, 2000; Ricks et al., 1990), in which case we argue here they must accept ultimate responsibility for the integration through WIL. In doing so, they need to draw upon their training as educators, their personal experiences and research.

The first recommendation is that program leaders should formally state that their WIL programs *require integration of knowledge*, and set this as an explicit learning objective. This objective can leverage a variety of approaches – many of which are already used in WIL such as reflection (this is discussed in more detail below). They then need to develop specific pedagogies/activities that will foster and measure integration. Examination of the model for WIL proposed by Apostolides and Looye (1997b) provides a structure for how we might frame this. In the early stage of WIL we need to equip students with basic content knowledge necessary for their discipline of study, but begin with 'exposure' to the profession, and critical thinking skills. We then need to progress in complexity and sophistication in terms of development of students as reflective practitioners. In a very pragmatic sense this development might be fostered by practitioner visits to the workplace, or employer presentations on-campus. Collier and McManus (2005) suggest WIL programs need to include such strategies that help students see the relevance of on-campus learning and how it might apply to the workplace setting before they go on placement. Such activities are often already part of many WIL programs, but our proposition here is these should be *directly linked* to the notion of integration. In the latter stages the integration would then become more explicit via reflection activities, which are discussed in detail below.

Second, as noted above, the reflection activities/pedagogies reported in this work consist of reflection-*on*-action; that is, reflection after the event. This approach whilst valuable (as noted by all stakeholders here), is but one reflection tool open to us. Schön (1991) proposed a model for reflection based on two approaches: reflection-*in*-action, and reflection-*on*-action. Reflection-on-action is defined in the literature as: "The retrospective contemplation of practice undertaken in order to uncover the knowledge used in practical situations, by analyzing and interpreting the information recalled" (Fitzgerald, 1994, p. 67). Atkins and Murphy (1994) take this idea one step further and suggest that for reflection to make a real difference to practice we follow this with a commitment to action as a result. In

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contrast, reflection-in-action means to think about what one is doing whilst one is doing it (Boyd & Fales, 1983; Greenwood, 1993), and it allows the student to redesign or think about what he or she is doing whilst he/she is doing it. This is commonly associated with experienced practitioners.

Neither of these models of reflection takes account of the importance of reflection-*before*-action, that is, when we plan out *before* we act what we want to do. As might be expected, reflection-before-action is preceded by reflection-on-action and reflection-in-action. There are a number of ways we might develop student skills in reflection-before-action. Gibbs (1988) proposes a six stage model. The first stage is to produce a *description* of the event, where a student describes in detail the event they are reflecting on - where were you; who else was there; why were you there; what were you doing; what were other people doing; what was the context of the event; what happened; what was your part in this; what parts did the other people play; what was the result. The second stage involves *feelings and thoughts*, the notion of self awareness. At this stage, the student tries to recall and explore those things that were going on inside their head: how they were feeling when the event started; what they were thinking about at the time; how did it make them feel; how did other people make them feel; how they felt about the outcome of the event; and what do they think about it now? Stage 3 is *evaluation* in which the student tries to evaluate or make a judgment about what has happened, and considers what was good or bad about the experience or what did or didn't go so well. Next is *analysis* in which the student tries to break the event down into its component parts so they can be explored separately. The student may need to ask more detailed questions about the answers to the last stage. Including: what went well; what did they do well; what did others do well; what went wrong or did not turn out how it should have done; and in what way did they or others contribute to this? Finally is *conclusion and synthesis*, which differs from the evaluation stage, in that now the student has explored the issue from different angles and now has a substantial amount of information to base judgment on. The final stage involves the formulation of an *action plan* and during this stage the student should think forward into encountering the event (or similar event) again and to plan what they would do – would they act differently or would they be likely to do the same?

Gibbs model incorporates all the core skills of reflection. Arguably it is focused more on reflection-on-action, but it also can be used to focus on reflection in-, and before-, action. With this forward focus it is consistent with Boud's notion of lifelong learning, and its focus on forward thinking (Boud, 2005; Boud & Falchikov, 2006; Boud, Keogh & Walker1985). One of the practitioners in the present work stated that the students "don't have time to reflect when in workplace." No doubt when a student first begins work, this lack of time may appear to be the case. But modern technologies allow practitioners to foster such reflection via say on-line portals or using freeware or third-party software such as Moodle™ and Blackboard™. The portals could be based on Gibb's (1988) model described above, be staged in using the sequence proposed by Apostolides and Looye (1997b), and incorporate Hodges (2008) portfolio assessment approach. One simple task would be an on-line reflective journal that specified all three versions of reflection described above.

The third recommendation involves practitioners working with employers/workplace supervisors to develop more formal pedagogies for workplace learning. The research findings in the present work indicate students do learn many things on placement, but this learning seems very ad hoc. The sole model in practice seems to be the apprenticeship model. We are not arguing against an apprenticeship model *per se*, but suggest that to ensure learning occurs in the way we intend, we need some structure (e.g., to see how mentoring might work best). A framework for learning, based on enhancing student self-efficacy is proposed by Coll, Lay and Zegwaard (2002)

This framework is derived from the work of Fletcher (1990, 1991), who suggests WIL can encourage learning by a process of *enactive mastery* (i.e., as students with sound mentoring are scaffolded though their learning in the workplace they gain in confidence as they 'master' tasks). Coll, Lay and Zegwaard (2002) subsequently looked at the influence of placements on student perceptions of their practical ability. This perception, they argue, enhances student self-efficacy, and thereby practical skills in a number of ways. First, students learn some practical skills at their HEI. Even though they are typically very nervous when they first start in off-campus placements or projects, as they practice under supervision they gain in skill and in self-efficacy. This gain is mediated by good mentoring enabled by *verbal persuasion* (i.e., positive verbal encouragement from their mentors), and *personal evaluation* of their own capabilities (or other peers deemed comparable in capability).

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Helping students, academics and employers maximize work integrated learning opportunities

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BACKGROUND

In New Zealand the importance of developing competencies that are required by graduates in the work place has been highlighted recently in research fields such as business and science (Burchell, Hodges, & Rainsbury, 2000; Coll & Zegward, 2006; Hodges & Burchell, 2003; Sleap, & Read, 2006). The benefits of work-integrated learning experiences to enhance these competencies have also been emphasized in the literature (Dressler & Keeling, 2004). In the sport and recreation industry, practical work experience, good communication skills, and passion and enthusiasm, along with a strong business knowledge base have been highlighted as being important requirements for employability (Bell, Grebert, Partrick, Bates & Cragnolini, 2003; Wiersma & Bradbury 2004). In particular, the work-integrated learning experience can provide a point of difference for graduates that employers value (Martin & Hughes, 2009). There are three stakeholders, students, lecturers, and industry supervisors who have a role in helping the learner maximize tertiary work integrated learning opportunities and develop the personal attributes and capabilities required of the graduate to be successful in the workplace (Fleming & Eames, 2005). However, anecdotal discussion indicated that none of the stakeholders in sport management felt informed about the best methods/practical examples to help.

CONTEXT

This current investigation aims to help maximize work-integrated learning (WIL) by presenting best practice examples for students, lecturers, WIL supervisors, and employers. Feedback was analyzed from graduates of the Bachelor of Business Studies and Bachelor of Sport & Exercise majoring in Sport Management at Massey University, Palmerston North. The work experience component of these two degrees involves final year students completing a major project over two semesters based within a sport organization. The learning experience is facilitated and supported by an industry supervisor from the placement organization as well as by an academic supervisor from the University (Fleming & Martin, 2007; Martin & Leberman, 2005).

METHODS

This qualitative case study involved an initial focus group interview followed by a questionnaire, which was emailed to a sample of previous graduates of the Sport Management program (30/100), some of whom had also been work place supervisors. The three open-ended questions focused on:

- How the following people (students, academic practicum supervisors, theoretical paper coordinators and work place supervisors) could help students maximize their work place experience?
- The five most important competencies that students should focus on during their work place experience to make them employable; and
- How the above people could assist students in developing these competencies before and during the practicum?

The descriptive responses were coded and then combined into themes. The nature of qualitative and case study research seeks to form a unique interpretation of events rather than produce generalizations, but it is expected that the findings of this current project can be transferred to other WIL contexts. The credibility and dependability of the research was enhanced by triangulating the data involving relevant documentation (e.g., course/paper outlines, graduate profiles, etc.), and the literature (Stake, 2008; Yin, 2003). The reporting of the descriptive responses attempts to convey the holistic understanding and meaning of the phenomena under study (Merriam, 1998).

RESULTS AND DISCUSSION

There were nine key themes developed from the qualitative findings. Enthusiastic participation, self sufficiency, and personal organization were similar to the top three highlighted key competencies from Fleming, Zinn and Ferkins (2008) quantitative findings for sport and recreation students/graduates, ability and willingness to learn, initiative and personal planning, and organizational skills. The following typical comments from a student, academic and workplace supervisor, respectively, highlight each theme. These comments have been compiled and published in *How to Make the Most of Work-Integrated Learning: A Guide for Students, Lecturers, and Supervisors* (Martin & Hughes, 2009). They aim to help students maximize their work place experience and assist students in developing these competencies during their work place experience:

Immerse yourself... don't go into a [workplace] situation trying to be an observer, but to utterly embrace the experience.
Keep reinforcing the importance of showing initiative and being proactive.

Have action plan type documents and make sure the students are involved in completing these. This may help them see the bigger picture and how things are broken down into smaller tasks.

Three soft skills themes were identified related to communication skills, self confidence, and customer relationship management, which support those highlighted in job adverts as being important requirements for employability (Wiersma & Bradbury, 2004):

Learn how to 'talk' to different people and realize that people need to be communicated to in different ways.
Encourage openness so that students understand it is better to ask for help than to get things wrong when it matters.
Get the student to put themselves in the customer's shoes and understand what it is that they want of the service that you provide.

The seventh theme identified, developing professional networks involving relationship building, teamwork and cooperation, needed to be focused on during the student's industry placement, as highlighted by Fleming and Eames (2005). This network was particularly important when finding employment as it was emphasized "it's not what you know, it's who you know."

Ask the contact to consider their current networks and how they could extend and develop these.

Give the students opportunities to develop and extend their networks via ex-students, visits to organizations, guest lectures, exposure to a range of networks in the community.

Ask students what their job prospects are and then expose them to networks which may help.

The context specific competencies of developing industry and business knowledge, and professional ethics were the other two themes identified, as important for a graduate:

When in [the workplace] organization leave the student persona at the door and imagine yourself as a member of staff and what the required conduct would be for actions, dress, etc.

Ensure the students know clear expectations on their behavior before they undertake their [project(s)]. Maybe they need to have practice meetings, or an induction to being in the workplace.

Have clear expectations for the students about professionalism, and how the organization operates. Ensure there is a good process in place to induct students into the organization.

Fleming, Zinn and Ferkins (2008) reported that academic supervisors ranked computer literacy and written communication in the top five skills for the students to have developed prior to starting their cooperative experience. This may be a reflection on the requirements for students to complete the academic assessments (e.g., reflective journal & final project report). In this current study these competencies were an expected part of industry knowledge:

Be familiar with Microsoft documents, including MS Word and MS Excel as well as other computer programs and computers in general.
Give warning to students about the computer programs they are likely to need to use and offer them places to look for information on how to use them if they don't know.
Be willing to teach the students how to use computer programs if they don't know and mentor them while working on it until they feel confident to do it by themselves.

CONCLUSIONS AND IMPLICATIONS

To enhance employability in the sport and recreation industry, work integrated learning programs need to be designed so that students are provided with opportunities to facilitate the development of the competencies identified above. The findings of this study therefore will assist students, academic and workplace supervisors in determining what competencies students should focus on developing and

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enhancing throughout their work integrated learning experience in order to increase the likelihood of employment as graduates (Martin & Hughes, 2009).

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Learning in the learning workplace: tertiary institution staff perceptions

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INTRODUCTION AND BACKGROUND

New Zealand tertiary training providers are challenged to adapt to the increased bureaucratization of the tertiary sector, to move away from the rational economic, market forces-driven environment of the previous 20 years. This will take, among other things a shift to niche and specialty provision, reduced competition and duplication, capturing of non-governmental sources of funding, retention of learners to completion of qualifications with an emphasis on the higher levels (Level 4 and above), and post-initial qualification developments. It is a culture shift that demands movement of staff groups to new patterns of thought, motivation and practice. Tertiary training institutions (TTOs) along with other education and training organizations are being challenged to deploy their staff to best advantage and to support those staff in ongoing learning and development. Australian researchers have been looking increasingly over the last decade at what defines workplace learning (Harris et al., 1998). Billett (2001) describes workplace learning as affordances. Furthermore, the classic human resource literature on what might make a learning organization Schön (1973) and Senge (1990), and how such learning might be organized within regular work practices (Van der Krogt, 1998; Poell, 2004). In a large study, designed to contribute to capability building in the vocational education and training sector, Chappell and Hawke (2005) conducted a major literature review investigating learning and work. This led them to suggest that despite differing ways of expressing the characteristics of the work environment, an organization's learning environment can be clustered around four areas or domains:

- Work environment;
- Work process environment;
- Social interaction environment; and
- Managerial environment.

Chappell and Hawke (2005) subsequently developed a diagnostic tool based on their literature review, and trialed it in 2006 across nine registered training organizations in Australia, both public and private, that each employed more than 200 staff. The key messages from this trial reveal that employees in these organizations understand critical aspects of their work environment to be more intertwined than the body of research literature suggests, and that two aspects of the workplace appear to be of most relevance:

- *Organizational Environment*: this involves aspects of the ways in which the managements is structured and organized, the ways in which the organizations structures and processes allow or encourage communication, and the ways in which the work of the institution is shared among employees; and
- *Job Complexity*: this is the extent to which the individual jobs entail complexity, uncertainty or variety.

On the basis of this, a two domain *Provider Learning Environment Scale* with 45 questions, using a 5-point Likert scale response system was developed and trialed in 2007. Chappell and Hawke (2005) hypothesized that organizational environment is defined by items that focus on:

- Manager/management support;
- Intentional creation of learning opportunities by the institution;
- Involvement in teams;
- Provision of useful feedback on performance;
- A clear sense of the organization's mission/purpose;
- Ready access to necessary information; and
- Ready access to other people in the organization.

Further, Job Complexity is characterized by items that reflect:

- Work with considerable variety;
- Regular contact with a variety of people and ideas external to the organization;
- Regular contact with people and ideas within the organization;
- Ongoing change; and
- Work with high intensity/demands.

Of the 45 items, 19 relate to job complexity, and the remaining 26 to organizational environment.

METHODOLOGY AND CONTEXT

Theories and Models of Workplace Learning

The notion that people develop throughout their lives as a result of their work experiences, and the assumption that people develop know how which is defined as a type of knowing what to do in practice that is evident in their various intentional actions, is the basis of workplace learning. (Beckett & Hager, 2001) This adult capacity for learning amongst the experiences of the workplace supports the notion of lifelong learning. In policy terms the future of lifelong learning is connected to the whole person and their experience knowledge and skills possessed over a life time. A model of practice based workplace learning has been developed that incorporates six key features. These are: practice based informal workplace learning is organic/holistic, practice based informal workplace learning is contextual, practice based informal workplace learning is activity and experience based, practice based informal workplace learning arises in situations where learning is not the main aim, practice based informal workplace learning is activated by individual learners rather than by teachers/trainers, practice based informal workplace learning is collaborative/collegial. (Beckett & Hager, 2001).

Historically the standard paradigm of learning excludes practice-based learning from work. This exclusion is an indication of the ongoing tension between education and work. The problems stem from the assumption that vocational education is inferior, the assumption that front end model of occupational preparation is more superior, and the failure to provide an educational account of workplace performance and learning. There is a newer emerging paradigm which points the way to an educational account of workplace performance and learning to replace the theory practice account. (Beckett & Hager, 2001).

Thus the dualism in education/vocational education has been dominant influences in educational thought and practice. These dualisms have had major influences on educational practice, policy at social and political levels. There are some distinctive differences between formal learning and informal workplace learning (Table 1, Beckett & Hager, 2001).

TABLE 1
Differences between formal learning and informal workplace learning (after Beckett & Hager, 2001)

Formal Learning	*Informal Workplace Learning*
Single capacity focus, e.g., cognition	Organic/holistic
Decontextualized	Contextualized
Passive spectator	Activity and experience based
An end in itself	Dependant on other activities
Stimulated by teachers/trainers	Activated by individual learners
Individualistic	Often collaborative/collegial

New Zealand Replication

In 2007, our research team from Otago Polytechnic recruited participants to complete the two-domain *Provider Learning Environment Scale* as developed by Chappell and Hawke. This was carried out through direct contact with the research contact person in 16 public sector tertiary training institutions, all of whom are in the institute of technology, polytechnic grouping. The survey was put online through Otago Polytechnic's electronic survey software and all responses went directly to the organizational research officer. As researchers we have access to the summary data only.

RESULTS AND DISCUSSION

In response, 95 staff from nine institutions responded to the survey (Table 2), a mixture of academic and administrative staff. The value of results and the way data can be analyzed is heavily dependent on a reasonable number of respondents. Perhaps the research contacts were not the most useful way to enter an institution, possibly negotiated entry through the human resources section of each may have produced a higher response rate. It is also notable that the response rate was higher from those in the Southern institutions. Is collegial support for such research evident here? Or again, are there issues

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with the dispatch of the survey through Central and Northern institutions. This is a subject for further exploration.

In purely descriptive summary, the responses to these proposed components of *Organizational Environment* and *Job Complexity* show a high level (67%) of agreement with the statements provided (Table2, Figure 1). What the descriptive summary does not reveal is the complexity of relationships between the various factors in the questions. The respondents are disproportionately academic and teaching staff, with nearly two thirds of those responding in that category. A staff member's role within an institution can hugely affect many of the responses to individual questions, for example, those around relationships with external clients (Q6, 50% disagree), and extensive contact with professionals outside of the institution (Q1, 45% disagree). Responses to questions around change (e.g., Q20, *The Institution regularly changes the ways in which my work is organized*) may reflect the idea that change seems to have an impact of the work practices of administrative and support staff in the first instance (Q20, 46% agree).

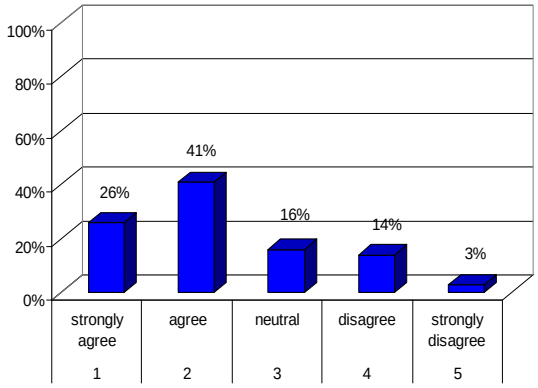

FIGURE 1
Aggregated results by percentage for all questions by respondents, for survey of New Zealand tertiary education trainers' using the *Provider Learning Environment Scale* (*N*=95)

The data analyzed were descriptive in nature, and so limited to frequency and cross tabulations. Respondents identified themselves as working in a grouping of four major categories:

- Academic Staff in Teaching Departments and/or Schools, 58.6%;
- Student Support Staff (e.g. career advice, learning support, counseling, health), 10.3%;
- Administrators, 8.6%; and
- Professional and Workplace Development and Entrepreneurial Staff (e.g., staff development, workplace learning and development, business to business), 22.4%.

Acknowledging the small number or respondents and the likelihood of some active subject specific professional relationships (and of course, the small overall population and the career movement of staff within New Zealand) no single institution has been identified in the results. Instead institutions were grouped into three geographical areas, North, from Hamilton east-west and north; Central, the remainder of the North Island; and South, the South island. Each group has a range of small to large in terms of student body and both metropolitan and provincial based institutions.

CONCLUSIONS AND IMPLICATIONS

As the response rate was low, it may be that this means of introduction to the available participants is not the most effective. Thus an alternative, such as distribution of the surveys through executive management, or the human resource section may result in a greater take-up rate. Overall, the level of agreement with statements was high by the participants, but summary by description only is of limited explanatory value. Factorial analysis of the two sets of data is a possibility for greater understanding. Given that the emphasis here is on discovering perceptions of what made a tertiary training institution a learning environment, it would be of interest to contrast the responses to items in this online survey with existing organizational work environment satisfaction surveys to discover similarities or differences. These then could help in the human resource and development planning for effective

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workplace learning. In conclusion the respondents were overwhelmingly academic and teaching staff. A more focused exploration of the perceptions of administrative staff could be of value and contribute to the structuring of job complexity and organizational practices with this group. Furthermore there could be further exploration regarding whether the low response rate from administration staff was due to their work schedules or just a negative perception of online surveys.

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TABLE 2
Summary findings for survey of New Zealand tertiary education trainers' using the *Provider Learning Environment Scale* (*N*=95)
Tertiary Training Organization(TTO)

	Mean	*SD*
My work involves extensive contact with professionals in other organizations	2.50	1.13
My manager in the TTO actively involves him/herself in providing me with learning opportunities	2.27	1.14
The TTO clearly communicates its mission/purpose to staff	1.97	1.01
My job requires me to work with a range of different networks of people in the TTO	1.77	.78
The TTO regularly creates project teams of people from different sections when something new crops up	2.35	1.04
My work requires me to undertake a high degree of negotiation with clients outside the TTO	2.93	1.34
I regularly meet with colleagues in other organizations	2.75	1.17
The objectives set for me relate directly to the objectives of the TTO	2.14	.88
In this TTO, co-workers routinely provide helpful feedback on performance	2.43	1.05
I have ready access to the knowledge or information I need for my job	1.98	.91
For most of my job, I deal with only a fixed part of the product/service my section of the TTO offers. Others do the rest	2.80	1.15
I am kept informed of changes that impact on the education and training provided by my TTO	2.09	.96
My job requires a high degree of concentration most of the time	1.54	.698
A lot of our work requires different sections to collaborate on a problem or issue	2.28	1.09
I am given sufficient feedback regarding my work	2.45	1.029
My work requires me to engage in professional conversations with colleagues outside my TTO	2.32	1.07
I have opportunities to work with different groups in my TTO	2.23	.98
My work involves me in a wide range of the TTO's activities	2.65	1.13
The TTO regularly changes the ways in which my work is organized	3.16	1.03
TTO Managers actively support and encourage learning	2.11	.96
I regularly work with other sections of the TTO	2.58	1.07
My work requires me to undertake a wide range of different activities	1.77	.82
My manager in the TTO sets me clear objectives for my job	2.40	1.12
The TTO has clear rules about who can access such things as information about individual clients	2.05	.938
My work requires me to undertake a high degree of negotiation with clients outside the TTO	2.97	1.27
Inter-personal relationships in my job involve managing a wide range of issues/personalities	1.61	.73
My work in the TTO often requires me to manage unusual situations	2.12	.98

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TABLE 1 *Continued*

	Mean	*SD*
In the course of a typical week, I will do a wide variety of very different tasks	1.73	.84
My manager in the TTO delegates some decision-making to me	2.04	.93
I've learnt a lot about my job from discussions with more experienced colleagues	2.04	1.04
The work I do in the TTO is complex and involves a wide range of factors and variables	1.85	.81
My TTO provides opportunities for me to undertake interesting tasks and rewards success	2.34	1.05
My manager in the TTO encourages me to learn while I am working	1.98	1.08
I feel that I am part of a team that works collaboratively to reach work goals	2.14	1.06
Relationships with colleagues in the TTO are collegiate rather than competitive	1.97	.89
Demands from the TTO's clients and my colleagues are a constant feature of my work	2.07	.89
My manager in the TTO works with me to develop, monitor and review my work plan	2.65	1.06
When faced with a new challenge in my work, I am aware of whom in the TTO I should talk to	2.09	.90
The way my job in the TTO is constructed, limits what I can do	2.89	1.06
My TTO actively encourages me to learn in order to improve my work performance	1.97	.98
My supervisors and line managers in the TTO routinely provide helpful feedback on my performance	2.80	1.11
The objectives set for me relate directly to the work outcomes of my job	2.22	.94
The TTO clearly expects all staff to support the learning of other employees	2.14	1.00
The TTO clearly communicates its mission/purpose to staff	2.11	1.06
My colleagues in the TTO share their knowledge with each other	2.04	.91

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The varying influence of the cooperative experience creating opportunities for employment

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BACKGROUND

While we assume that the cooperative experience will increase the likelihood of students gaining employment in their graduating field, this paper investigates the success rates of graduating students securing employment in an information technology degree program. It was thought that the rate of immediate employment of cooperative students by the sponsor organizations may be greater for internship students than for non-embedded project students. The cooperative literature suggests that students do achieve more immediate employment success following an internship experience particularly (Gault, Redington & Schlager, 2000).

ISSUES

One of the underlying issues addressed in this paper is the pre-selection and filtering by cooperative coordinators and staff leading to more favourable industry sponsors for some students. Is it fair that higher achieving students have more access to higher quality cooperative work places and sponsors? Does an embedded internship experience prepare a student better for employment than individualized projects that are not embedded? Another relevant issue was to find what percentage of graduates extended their internship or project into paid employment after the cooperative semester with that particular employer. However, some students reflect that finding employment was easier even if it was not with the same industry sponsor as their cooperative placement. The best industry placements are generally filtered to higher achieving students where the employers take on less risk and the university has less risk of embarrassment. In contrast, some low-performing students who are difficult to place in industry present a difficult dilemma for the institute as the reality of the cooperative experience highlights their deficiencies.

FINDINGS

Student Feedback

Student outcomes were examined over the time period 2006 to 2008 at the Eastern Institute of Technology (EIT). The EIT Bachelor of Computing Systems degree requires students to undertake a compulsory 45 credit (equivalent to 3 papers) internship or project over one semester in their final year of study. It appeared that Internship students do have a significant advantage in achieving ongoing employment with their internship sponsor (Table 1). As shown in Table 1, which spans two and a half years (2006–2008), some 66% of the internship students on the BCS degree at EIT reported that they secured ongoing employment with the industry sponsor after completion (the BCS degree is completed at the finish of the cooperative experience). This compares with BCS 'Project' students who only achieve a rate of 12% of securing employment at the cooperative site. However, due to a lack of record-keeping and tracking of alumni, the overall success of achieving any employment with any employer is not known exactly. It is thought that over 80% of BCS graduates do move onto IT employment with a very small number remaining unemployed or significantly under-employed in the Hawkes Bay region. One unintended outcome from this investigation was the revelation of how little we knew about our graduates and their progress after graduation generally.

Staff Feedback

Cooperative supervising staff on the BCS program were asked four key questions relating to the pre-selection of Interns and the equity of Interns having a greater likelihood of securing jobs with their industry sponsors at the end of their cooperative experience. The responses to each of these questions are now shown in turn, followed by responses to an open-ended question that sought general comments.

TABLE 1

Employment outcomes for Bachelor of Computing Systems students after the cooperative experience

	Employment with Sponsor	Employment with other	Unknown employment	Students Total
2008 Semester 2				
Internship	3			3
Project	1	2	2	5
2008 Semester 1				
Internship	1		1	2
Project	0	1	5	6
2007 Semester 2				
Internship	3	1		4
Project	1	1	6	8
2007 Semester 1				
Internship	3	1		4
Project	1	1	6	8
2006 Semester 2				
Internship	2	1	2	5
Project	2	6	8	16
Total				
Total Internship	12	3	3	18
Total Project	5	11	27	43

Question 1:
Do you agree with our practice of hand-picking/pre-selection ('B' average minimum) of higher achieving students for better quality industry placements (e.g., Gen-i / HB Health)?

Yes, although it's not the perfect solution. I believe we have an obligation to the internship provider to ensure the students we recommend to them have the skills needed to do the job (or to learn it) and the ability to work in a self-directed way. A grade average is more transparent to students and something they can work out for themselves, rather than doing a case-by-case assessment.

I agree that as a credible tertiary establishment, preselecting only the 'finest' BCS students is a valid method of selection. Not only will this raise the profile of EIT in the region but also the profile of our graduates as valid contributors in the twenty first century workplace. Those students who show potential should be encouraged to achieve.

Yes. Not all students are capable of industry placement (Internship) and it recognizes this diversity.

Yes, it is important to EIT that we maintain our credibility with industry. I'd hate to see a sub-par student embarrass us!

Question 2: Do you believe that students involved in an Internship are more likely to gain employment at the end of their degree than a standard Project student?

Maybe, this depends on various factors. If the internship provider has a job opening and the student has done well, they may be invited to apply. Apart from the provider offering a job though, I think a project student who has done an excellent project and has also got themselves work experience through relevant holiday jobs may have as good or a better chance at employment – e.g. being able to show an excellent web site may be better for getting a job as a web developer.

Yes, I would think that Internships makes for a much more rounded employee. 'Doing the job' is only part of the package. I feel it would develop their work ethics, communication and people skills too.

Yes – so long as they have done well. They have real world experience which will improve their CV.

Absolutely. Look at the employment uptake rate among interns. Do a good internship and you are likely to get employed (economic conditions permitting).

Question 3:
If Interns have an advantage with securing employment, do you believe this is fair to all BCS cooperative students?

As long as all students are offered the choice of internships, it's fair. By this I mean that if all students who meet the internship criteria (e.g., the grade average) can apply for an internship, it's fair. They may not then be offered an internship, but they had the

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opportunity to try. If they are aware they need an above-B average from early in their degree, there's no unfairness problem – they can do the work to get the opportunity; if they don't do the work they don't get the opportunity.

Yes, I believe this to be fair.

Yes. Life is not fair – get used to it!

Yes. If we state up front that only students who have achieved a B average or better can undertake an internship, than we are giving our students and incentive for doing well.

Question 4:
What expectation do you think students should have of securing permanent, career-type employment soon after the BCS completion?

I don't think this is an expectation EIT should offer – I think their chance of securing employment is based on their own skills and achievements, as well as their own initiative at getting relevant work experience and applying for suitable jobs. It might be nice for EIT to offer opportunities to meet with employers and/or learn how to find such work, but I don't feel EIT should be obliged to find students a job. On the other hand, EIT markets its programs by saying 'when you have finished this program, you will be qualified for a career in these areas …' – if not all students are qualified for those careers, are we providing misleading advertising?

Talking to a few BCS students at the end of their course (during project time) over the past few year, they are often very, very motivated and optimistic that they have can pick and choose where and how they want to work. The reality hits a few months later, I see some come back to EIT to study further or they have had to completely rethink and re-plan their future once reality bites!

Variable. Some students can expect several job offers, others will have problems.

This will depend on economic conditions. We must stress that employment depends a lot on attitudes and soft skills. Students who have a good work ethic and good communications skills will always find good jobs.

Question 5:
Any other comments around this area of the Project course leading to employment?

As well as a course which leads to employment, for many it's also a 'finishing' course where many students actually learn skills that were taught in previous courses. The students that missed a lot as they went through the degree won't be as ready for employment at the end of the Project paper because they had to spend the time on the Project learning skills they should have learnt before; students who did well on the degree will be better prepared for employment because they were able to "hit the ground running" when they did the Project, and spend the time honing skills or learning new ones.

I think the entire Internship/Project is a valuable experience, not only for the student but for IT staff, EIT stakeholders and the NZ population.

It is what makes ITP degrees different to many Computer Science degrees. It is the capstone of our degree and we should be proud of our students' successes.

DISCUSSION

The choices that students make about their cooperative participation and the early direction given by academic supervisors are now having a profound influence upstream in their entire program. The tracking of student outcomes, comparing internship employment outcomes to project-type employment outcomes over the last 3 years at one institute show that Internships appear to provide an advantage for immediate employment success. However this success is already indicated in the students achievements early in an entire course/program. Cooperative supervisors at EIT contributed to a discussion about their experiences in appointing and advising students in their cooperative programs and in securing employment. Supervising staff who worked with both Project and Internship students were comfortable with the selection criteria of a 'B' grade or above (over the previous 12 months of study) by the intending cooperative students to be allowed to proceed with an Internship. However, staff still believed in the value of the 'pure' Project with some strongly supporting the technical rigor of students developing IT solutions for a client in the form of a project. A successful Project student does have a concrete computing artefact which can be added to their CV and indeed can also be demonstrated to any potential employer. This is one area where the Project student does have an advantage over the Internship student.

Industry examples and some literature support the fast-tracking nature of the embedded work experience with some firms promising ongoing employment if the student meets expectations**.** IBM actively advertises opportunities for cooperative and internship students with the promise of gaining a competitive edge toward regular employment also pointing out that the workplace experience can give the student better insight for career decisions (IBM, 2009). Numerous job-seeking guides and books designed to assist the career search now include the specific advice on how to utilize internships to gain

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a foothold into a job (Green, 1997). The issue of the reluctance to present unreliable and minimal achieving students to industry is also wide-spread amongst cooperative providers. Faculty often are acutely aware of the representation of the university or ITP by students to industry sponsors and are keen to ensure that only 'quality' students are allowed into internship programs (Zegwaard, K., & McCurdy, 2008). There is some question as to whether students actually find the best placement for themselves given there is some competition amongst students for limited placements in some cities (Ram, 2006).

CONCLUSIONS AND IMPLICATIONS

There would appear to be definite pre-selection of students by cooperative supervisors and coordinators given the sensitivity of universities towards supplying quality students to influential sponsor organizations. This may have a flow-on effect on student's ultimate first employment position. By examining the success factors of students who secure quality employment positions we may be able to analyze and influence all student's motivations and achievements much earlier in their overall program of study. This investigation has also prompted EIT to investigate developing an alumni database system to help track graduates. There are a number of variables influencing employment outcomes stemming from cooperative choices so it would be premature to discontinue the purely 'Project' option. Also this study revealed the paucity of information about the ongoing employment of degree graduates in general and the reality may be that 'Project' students have equivalent employment success after graduation even if not with a cooperative industry sponsor. Careful consideration in assigning students of various capabilities and aptitude to the range of potential industry sponsors may help in issues of equity, fairness and optimizing employment success for the greatest number of students. Mentoring and advising students in their early years of study about the cooperative/employment pathway may also help motivate them for higher academic achievement levels generally thus opening up more fruitful cooperative experiences and quicker employment outcomes.

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Utilizing mentoring feedback in journalism work placements: producing work-ready graduates for the twenty-first century newsroom

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INTRODUCTION AND BACKGROUND

Australian Higher Education and WIL

In 2008, the Australian government under the new Labor leadership embarked on an 'education revolution' that aims to provide universal access to a high quality education from the earliest age, world-class teaching and learning in schools, and effective training and ongoing learning opportunities in universities and the workplace (Prime Minister of Australia, 2009). Through this education revolution, it is envisioned that Australia will become one of the most educated and highly skilled workforces in the world, and thus be able to secure national long term economic prosperity (Prime Minister of Australia, 2009).

Consequently, a review of higher education in the country was undertaken which lists nine key challenges and issues for higher education in Australia over the coming decades. Not surprisingly to many, first among these challenges is higher education's capacity in order to meet the needs of the labor market and industry for high level skills (Department of Education, Employment and Workplace Relations, 2008). These skills, which were identified in a 2007 study revealed that:

- Industry was satisfied with technical skills but see employability skills as under-developed;
- Higher education and training must meet industry employability skill needs; and
- Employability skills are acquired through many different experiences (Business and Higher Education Collaboration Council, 2008).

Among the recommendations resulting from the study included:

- Setting up an employability strategy fund to support development of strategies to address employability skills; and
- Funding to support work-integrated learning initiatives and integration of employability skills into curricula.

Journalism and WIL

A key feature of Journalism education at James Cook University (as with all other Australian journalism schools) has been that student graduates are able to demonstrate that they not only know the subject but can do the work in the real world. Students are taught the skills of news writing and other forms of journalistic writing, sound and video production as well as computer and online skills. These are coupled with theoretical discussions of society and world perspectives that serve to contextualize the work students produce. At different stages of each subject, students are required to gather their own news stories and produce their own 'texts', whether these are in the form of print, broadcast or online materials. These exercises form a substantial part of their learning process particularly in addressing areas such as politics, law, economics, culture, government, people and place in Australian society and the world.

One other way by which students are able to learn journalism has been through internships and work placement. It has been long-accepted that in order to ensure that students can actually 'do' the work is by providing them opportunities to experience learning that utilizes their academic experience within a real workplace. Through this interaction with journalists in the field, learning revolves around discovery, analysis and integration of information leading to deep-level learning. Students develop effective communication and become adept at problem-solving. The Australian journalists' profession association/union, the Media Entertainment and Arts Alliance (MEAA) lists these two ways of entering the journalism profession. On its website, it states: 'Traditionally there are two ways into journalism' –

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University Degree or Cadetship (Alliance Online, 2009). Under university degree, the MEAA is quick to point out that while university degrees are well regarded by majority of employers, it will be to the student's advantage "if you can back them up with relevant industry experience" (p. 1).

In a broad sense, this approach to learning is what Work-Integrated Learning (WIL) programs aim to offer. WIL is an attempt by educators to provide a 'schooling-to-work' pathway to support employability (Calway, 2006). WIL aims to assist in producing work-ready graduates who are also lifelong learners.

This emphasis on real-world experience is made more urgent by the current trend of the ever-changing newsroom. Media convergence has forced previously separate technologies and processes in the newsroom to come together, and synergistically create new efficiencies. In the 2006 State of the News Print Media in Australia Report published by the Australia Press Council, it notes one of the five major trends in the industry, major changes in the role and expectations of journalists (SNPMA, 2006). The report notes that in the future, journalists employed by newspaper companies will find their stories used not only in print, but also in other news media such as online and television. This implies that the journalist will have to be multiskilled in the various formats. It may also imply that given the huge cost of running a converged newsroom, many employers are cutting back on hiring and instead, looking to hire a Jack/Jill-of-all-trades type of journalist. Already, we have seen news organizations such as Fairfax Media which cut 550 jobs in August 2008 in an effort to bolster profitability (Fairfax Media to cut 550 jobs, 2008). This figure represents 5% of the company's workforce in Australia, and New Zealand.

CONTEXT

Research presented in this paper serves as background to a larger research project on enhancing the journalism work placement program at JCU to produce work-ready graduates for the twenty-first century newsroom. Specifically, the study aims to identify the gaps between academic training in journalism and actual needs and expectations of employers. It is hoped that mentors will also come to appreciate their role in the socialization process while giving feedback that allows the student to reflect on learning and development as a journalist. Feedback can also be used by the University in reshaping its journalism curriculum. Ultimately, a true working reciprocal relationship will be established and all three partners will benefit. Funding for the research is provided by JCU's Work Integrated Learning initiative through the Carrick Institute for Learning & Teaching.

METHOD

Data was collected from reports submitted by placement supervisors or mentors to the university at the end of the student's work placement. These reports date from to 2003 to 2008. A qualitative analysis was performed on the mentors' reports. Data were collated, analyzed for recurring themes, which were turned into key phrases reflecting the mentors' comments. Pseudonyms have been used to preserve confidentiality. It is worth noting that prior to this study these mentor reports have not been utilized in any useful manner except as proof that the student had completed the work placement subject. This is a major oversight as these reports contain valuable information on the mentors' views and recommendations on the value of the work placement and the skills and weaknesses JCU journalism students possess close to or at the time of completion of their university study.

RESULTS

There were 28 supervisor reports obtained and they ranged from 2003 to 2008. It should be noted that before 2009, the internship/placement subject was not required of the students. It is only this year that all journalism majors are required to undertake placement and this is in response to expressed requirements by employers for entering cadets to have had real newsroom experience.

Strengths

Majority of the mentors expressed satisfaction over the quality of student writing and their preparedness to undertake writing assignments. For example, Scott wrote: "Sarah handled tasks with

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aplomb a minimum of supervision. She produced news releases at a consistent quality and had many pieces picked up by the local media."

A number of mentors praised the interviewing skills interns brought into the work. For example:

Melissa proved she could carry out an interview both over the phone and on-site. She managed to turn these interviews into stories.

Mark was capable of approaching almost anybody and getting interesting responses to the most varied of questions. He asked the right questions and got on with it, so that the work could be completed to deadline without too much fuss.

From their comments, it was noted that majority of the mentors required that interns display initiative in pitching a story idea, and getting it. During an initial meeting of an industry advisory board for JCU's journalism degree, ABC North Queensland Online's Winsome Denyer, herself a JCU journalism graduate, said more than writing skills, students need to be able to generate story ideas (Unpublished minutes, 2009). It is as important to be able to determine if there **is** a story and what it is, as being able to write it. In today's generation user-generated content, otherwise known as citizen journalism, it is important for journalists to know what kind of stories are of interest to their readers.

Areas of Improvement

It is quite interesting that while mentors praised the high quality of writing that interns brought to the placement, it is the same theme that received the most comment for improvement and revision. Admittedly, the changing media landscape has forced many journalists to be able to adapt to various publishing platform; print, radio, broadcast and on-line. JCU's current journalism curriculum is still heavily print-orientated, and thus trains students for this platform. The majority of the mentors indicated a need for students to be aware of what platform they are targeting for their stories:

Generally, Wayne's writing technique is very good. However, he often struggled with the concept of "writing how we speak." He often wrote as though writing for a newspaper rather than radio news copy.

The quality of Sean's work improved over the semester as he adapted to the television style of writing. However, most of his stories still required fairly substantial subbing [i.e., subediting]. He has indicated a willingness to work on his voice, which will be necessary for him to be put on air.

The difficulty with adapting to different platforms also brought to light the need for students to be technically proficient in computer use, audio and video editing software and other online skills. Two mentors commented on how well two interns were able to adapt and learn the new technology quickly:

Gina quickly became proficient in the use of the ABC [i.e., the Australian broadcasting Corporation] equipment used in collecting and editing audio stories: The Marantz recorder and Netia editing.

Her [Tanya's] technical skills were remarkable. She was often only introduced to something relatively new – like our audio-editing system – once, and would master it within a couple of attempts, if not, at once!

What the above comments indicate is a need for current journalism students wishing to gain employment in an industry that is now technologically-driven, to be exposed to such technology. This can create quite a problem as there are many types of equipment and software available . However, basic skills in the use of specific software for editing audio and video, for example, are transferable and useful in adapting to varying models and software. Finally, many of the mentors commented on the need for interns to display more professionalism on the job. Meeting deadlines and handling pressure were common themes reiterated by mentors. There were also scattered comments on manner of dress, punctuality, the need to establish rapport with newsroom staffers and the need for students to develop confidence and initiative in performing assigned tasks.

CONCLUSIONS AND IMPLICATIONS

The comments and recommendations of journalism mentors yielded valuable feedback on the current journalism offering at James Cook University. In general, mentors are satisfied with the print writing skills that students bring to the work placement, due in large part to the (still) print orientated training students receive. Interviewing skills which are taught as an integral part to the news gathering process was also cited as a strength which can be utilized across various media platforms.

The areas of improvement give rise to issues that need to be addressed if JCU is to continue producing work-ready graduates in journalism. Most notable is validation for the continuance of the journalism internship subject where students are exposed to real life work situations in a real world newsroom.

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Comments relating to initiative, confidence, enthusiasm and building rapport with co-workers all point to areas which may fall beyond the realm of academic instruction, but could well be part of a strengthened WIL-enhanced placement that results in better socialization, and contextualization for the student. Through the placement, the student is exposed to a diverse range of working styles and cultures. For their part, mentors benefit from engaging with bright, energetic and focused young people. They are able to monitor student performance and to train students with specific skills suited to the organization with a view to longer term employment.

A significant implication from the research is the apparent lag between journalism curricula offered by Australian universities, and real work requirements for young journalists to be multi-skilled across the various media platforms, a facet of today's technologically driven news delivery systems. These preliminary findings will serve to inform the next phase of the research which involves gathering more detailed responses from employers within the journalism profession regarding needs and expectations. Literature and preliminary interviews with colleagues from the University of Sydney, University of western Australia, Queensland University and Bond University indicate that journalism academics are aware of this lag, and are in the process of assessing existing curricula to address this lag. For its part, JCU has undertaken a review of its journalism curriculum. The review which included convening an industry advisory board will seek to establish a new, refreshed bachelor's degree which addresses the gaps in basic storytelling skills, adaptability across media platforms and technical proficiency to address the rapidly changing environment of the twenty-first century newsroom.

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Coming into the workplace: an exploration of early-career police learning experiences

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INTRODUCTION

Cooperative education as a pedagogical tool is often conceptualized as an opportunity for learners to learn from and within a workplace, where learning is understood as the acquisition of skills and behaviors making the student more 'work-ready' and employable at the end of the experience (cf. Cannan, 2008). This paper does not challenge the value of cooperative education as a tool of learning and for improving outcomes for learners, but argues that university students, as learners in the workplace, are not passive participants, but critical agents in the learning process, both in the active selection of their learning experiences and also in the impact they have on the workplace itself. The dominant view of cooperative education understands the experience as a period of acquisition with the student being a passive participant in the process being directed by the already existing structures of the workplace they are in. This paper challenges this conceptualization and argues that the process of learning in these settings has dual outcomes for the student as well as the workplace.

BACKGROUND

Learning has often been seen as a contest between two rival metaphors; namely the older once dominant metaphor of acquisition and the more recent challenger of participation (Hodkinson & Hodkinson, 2003). In many educational settings, both within the classroom and workplace, learning is conceived of as being individualistic, dependent on transmission pedagogies and associated with the transfer of a decontextualized knowledge separated from the activities of life (Guile & Young, 1998; Kozulin, 2003; Wenger, 1998). Through such a conceptualization collaboration is discouraged and assessment of learning focuses upon the achievement of the individual in examinations removed from context. Such a view of learning ignores the complexities of human interactions and fails to consider learning as a social process with its meaning being in the 'lived-world' (Fuller, Hodkinson, Hodkinson & Unwin, 2005; Guile & Young, 1998; Holmes & Meyerhoff, 1999). Wenger (1998) argues that learning is better conceived as the intellectual intersection of understandings of meaning. Meaning derived from experience and activity, meaning derived from practice through participation, meaning derived from belonging to a community and the shaping of identity within the social world.

Learning in the social world involves the acquisition of tacit knowledge, which is situated in the activity that is occurring (Steadman, 2005). Through participation, "…individuals develop personal identities that are shaped by and are formative of their activities in the various communities in which they participate" (Greeno, 1997, p. 7). Learning success is therefore defined as the ability to learn from others, operate in the given environment, and be accepted by the community. Billett (1996) regards 'situated learning' as separate from the notions of socialization and internalization. He concluded that although there is significant exposure to the sociocultural aspects of a community through interactions with experts, this does not directly correspond to the fundamental changing of the novice. He conceded that, given the power differential between expert and novice, the dominant values of the expert may influence the behaviors and attitudes of the novice, but only in so much as these changes serve to fulfill the learning goals of the novice.

Learning through participation is a two-way interaction in which participation both shapes the knowledge of the learner as well as shaping the collective knowledge of the community (Lave & Wenger, 1991). The process of learning is not a predetermined path of coming to be within a community, but is instead unique to the individual based on the person's own dispositions to learning (Billett, 2002; Hodkinson & Hodkinson, 2003; Lave & Wenger, 1991). A learner's dispositions, formed through personal histories, determine the values that are assign to the effortful task of learning and the learner's goals (Billett, 1996). A learner's level of engagement with the practice of the community is underpinned by personal histories, which are shaped through social experiences, and continue to

develop through the process of learning within the transforming social practice of the community. Learning opportunities emerge through the relatedness between the individuals' histories and the values and practices of the community (Valsiner, 1994).

METHODOLOGY AND CONTEXT

The methodology employed in this study is a qualitative case study (Stake, 2000; Yin, 2003) providing for deep analysis of and insight into an individual's encounter with the phenomenon being studied. Data were collected through a series of one-on-one semistructured interviews and observations of participants in the field during a normal shift. The individual interviews provided for an exploration of phenomenological ideas, but also for clarity and triangulation of field-based observations (Marshall & Rossman, 2006). The interview, combined with observations, helped the researcher understand the meaning that everyday activities held for individuals, and provided a more substantial perspective of the phenomenon. In the observations of practice, the researcher was best defined as a 'peripheral member-researcher' (Adler & Adler, 1987). The data were analyzed using the data analysis spiral (Creswell, 2007), within a framework grounded in notions of situated learning. This perspective presents knowledge as not being something that is a self-sufficient substance, but as something that is intrinsically linked to the situation; that is, the social, cultural and physical world in which the learning occurs (Brown, Collins & Duguid, 1989).

The research reported here was undertaken as part of a doctoral study within the New South Wales Police Force. In New South Wales, police recruits generally move through a pattern of study where they begin at the Police College for a period of approximately six months, and then take a position as a probationary constable within a designated Local Area Command. The period of probationary constable has a usual duration of 12 months, during which time the new recruit continues to complete 'formal' university study via distance education. This period of time can be considered to be a phase of cooperative education or work-integrated learning, with a close link maintained between the university and workplace educators around the design and implementation of the learning experiences.

RESULTS AND DISCUSSION

Eloise (a pseudonym) came to policing at the age of 50 after having been a nurse and nurse unit manager for nearly 25 years. During her previous working life Eloise had undertaken a range of study including the pursuit of postgraduate study in management. As a nurse unit manager, Eloise was responsible for the running of an entire hospital ward of nursing staff, including the review of the nurse's work standards, rostering of staff, and monitoring ongoing professional learning. For herself, though, Eloise felt that there lacked the "challenge" in the learning and tasks of nursing, it was "getting boring". Policing presented to Eloise a "new challenge" in which she thought she could outperform those already doing it; she felt she had something to offer to policing given her background managing and working with people. Although Eloise is quite clear that she does not intend to move up the ranks of policing, and she is more than happy and willing to allow others to be the managers, she does believe that her experience is of value within policing, and that through working with others she will be able to share this with them.

Eloise's age and experience proved to be an advantage in accessing learning within her new community. Before coming to policing Eloise already had a perception of the role of the police officer, and her decision to join had been carefully considered. She had friends and relatives who had been police officers, and she had experienced through them the demands of the job. Furthermore, through her previous work as a nurse she had encountered the diversity of humanity in a similar way to that of police. She recognizes that other probationary constables who are much younger and therefore lacking her life experience, find the transition into the policing profession more difficult, particularly in communicating with the public, making their presence known and taking control of situations, which she identified as attributes she had developed in her previous roles. This was highlighted when Eloise described another early-career police officer who was young (21 years of age), and who was "finding it difficult" because of a lack of "the life experience":

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I was talking to her last night and she was finding it difficult communicating with people, she has never had to communicate with the general public. Whereas I have had to it was part of my role to conflict manage and all that stuff, so I am used to it.

However, Eloise's experience also proved a hindrance to her learning as the perception of those working with her was that she would know more than other early-career police. In her early training Eloise was "pushed" to a level equivalent to that of police with almost 12 months experience, with her partners expecting her to complete tasks and operate in a manner that was akin to a more experienced officer. She perceived this more as a challenge than missing the opportunity to learn the basics. She describes the initial learning experience as "having been thrown in the deep end." Importantly, though being pushed to perform in a demanding command, Eloise perceived herself to be within a supportive workplace with many of the officers having only recently experienced what she was going through. She saw these challenges as opportunities in which to push herself, rather than negative experiences, this is very much a reflection of her articulated learning disposition.

As an early-career police officer, Eloise also continued in employment as a nurse unit manager on her days off. Her roles as a nurse and police officer, at times, overlapped though she sees the two roles as being quite separate and that she is able to move freely between the two, within both hospital and policing settings. She described a situation where she and her policing partner attended a suicide attempt by hanging. Her partner reached the person first and cut her down from the tree, returned to Eloise, and gave her access knowing that she was a nurse. Despite her lower rank, her partner was a Leading Senior Constable, Eloise took control of the situation and guided both her partner and later the ambulance officers to resuscitate and intubate the victim. During an observation, by the researcher, another Senior Constable used Eloise's knowledge of mental illness to understand how best to deal with a woman who was harassing the public, and later Eloise also 'medically' attended to her partner after he was accidentally sprayed with 'capsicum' spray during an altercation. Obviously, Eloise's expertise in another field was valued by the police community, which allowed her to grow in confidence and quickly earn the respect of her colleagues. Such perceived value by the members of the community shifted her view of herself as having aspects of expertise that, in turn, affected her further learning.

CONCLUSIONS AND IMPLICATIONS

Learners do not partake in cooperative education programs as *tabula rasa*, instead they bring to the experience their histories and dispositions to learning. The cooperative education experience is not just about the acquisition of skill and knowledge, but also about navigating the social and cultural landscape of the workplace through participation in the activities of the community. The process of learning, as suggested by Billett (1996, 2002), is an effortful task in which learners are driven by the values that they associate to particular experiences. Learners are critical agents in the process of cooperative education, and therefore are able to shape and determine the outcomes that can be achieved. Coming to the workplace environment with histories and experience means that learners are also able to demonstrate and share this expertise with existing members of the community. Such a position has implications to the allocation and structure of work to provide challenge, but not disengagement building, confidence and commitment to the process of learning and the activity of workplace community, a finding supported in other research (e.g., Eraut, 2004). For cooperative education practitioners, these conclusions argue that there is a need to be more astutely aware of and responsive to the individual in the learning process.

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Should values education be part of the co-op curriculum?

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INTRODUCTION

With the introduction of values education in the primary and secondary education curriculum, the Ministry of Education is taking a renewed interest in values and ethics at schools (Ministry of Education, 2007). Values education is now seen as one of the three core 'pillars' of the New Zealand Curriculum, the other two being key competencies (e.g., thinking, language, participation) and subject learning (e.g., English, science, etc.). Thus so far it has only been applied to the primary and secondary education sectors, however, values education should be of interest to the tertiary education sector, particularly where learning situations (e.g., work placements) could easily lend towards exploring values within communities of practice. Values was taught as part of the curriculum pre-1980 and are currently included in the curriculum of other countries, such as *character education* in the USA, *moral education* in Japan (Sakamoto, 2008), and *values education* in Australia. Teaching of values can be controversial. Hill (2004, p. 6) puts it well, saying that, "values are caught between the devil of value-free rationality and the deep-blue sea of conditioned conformity; education is about liberalization not domestication, but we want out of it responsible citizens not fence-sitting self-pleasers." Workplaces are often faced with situations where decisions are made based to adherence to a particular value system or ethical code. Indeed, students on work placements are likely to be faced with situations where they either have to make ethical decisions or see the practice of such process (correctly or not) by work colleagues and supervisors. Some communities of practice have well-established 'codes of practice' or 'ethical codes' to which they must adhere (e.g., engineering, medicine, lawyers). However, in the case of many communities of practice (e.g., science) there are no established ethical codes, despite the fact that most practioners in such communities are often faced with having to make ethical or morally based decisions.

BACKGROUND

Definitions of Values

Values are derived from systems such as culture, political and religious systems. Often, in everyday settings, values are taken to mean moral values (e.g., honesty, respect, truth, etc.), with the assumption that values are similar or even synonymous with ethics. However, values by definition is broader and can include aesthetic values (e.g., symmetry, beauty), economic (e.g. productivity), intellectual, political, and, particularly of late, environmental. There is considerable confusion and overlap of the term values with other terms such as ethics, principles, fundamentals, and virtues. Halstead and Taylor (1996, p. 5) define values as "Principles, fundamental convictions, ideals, standards or life stances which act as a general guide to behavior, or as a reference point in decision-making, or the evaluation of beliefs, or action." Ethics tends be more centered on moral values and have a greater focus on the application or outcomes of adherence to such moral value systems (Buckeridge, 2002). In practice, ethics is concerned about what is right or fair, and focused on what we ought to do (i.e. actions) rather than describing (Preston, 1996). Virtues are often combined into moral values, however, by definition tend to focus on the practice with excellence of some particular values (Collins Dictionary, 1992). The virtues often adopted in the western world are either the biblical virtues of love, joy, peace, patience, kindness, generosity, faithfulness, gentleness, and self-control, or the classic virtues of temperance (moderation), prudence (wisdom), fortitude (courage) and justice. Fundamentals are core or foundational values from which other more abstract values are derived, being comparable in meaning to 'principles' which are described as being 'first in importance values' (Collins Dictionary, 1992). In addition to overlaps of commonly used terms, some attributes could be naturally categorized under several terms as well, for example, patience is a virtue, a value, a fundamental and also a character trait.

The New Zealand Ministry of Education has clearly taken a broad meaning of the term values by defining it as "principles or standards [used for] judgments of what is valuable or important in life" (Ministry of Education [MoE], 1999, p. 57). It is likely that the Ministry is focused on 'public values' (i.e.,

creating responsibly citizens, community morale) rather than moral values. The Ministry's broad interpretation of values in the 2007 New Zealand Curriculum gives flexibility and allows for inclusion of values such as 'participation for the common good' and values that could be described as character attributes (e.g., curiosity, innovative, self confidence) or competences/skills (e.g., excellence, consistency, accuracy (see, MoE, 2007).

Why Does Co-op Need to Explore Values Education?

Within each community of practice there will be everyday decisions made that inherently require adherence to a value system. In the context of science, for example, there are societal responsibilities of being honest, impartial, thorough, and truthful about research outcomes. Financial auditors need to be impartial, honest and incorruptible whilst maintaining a practical interpretation of accounts; business managers may need to make judgment decisions that balance the need for financial productivity and the wellbeing of its customers (e.g., car manufactures). Values are inherently important for the proper and effective function of each community of practice, irrespective of what that practice may be.

When members of the community of practice make decisions with moral implications, the outcomes from these decisions are often observable; even at times the actual decision-making process is observable. Since placement students are 'situated' in such environments and can readily observe the process, the opportunity of situated learning presents itself (Lave & Wenger, 1991). Reflecting back on the experience, whether it be from observation or partaking, students should be able to learn knowledge that could influence their own decision making when later faced with similar situations (Schön, 1983). In addition, it is important for students to not only understand their own value system but also be able to identify values as part of developing goals and strategies (Reid, 2002). Often underpinning values are not clearly identified, resulting in strategies that lose sight of the original intent (Royal Commission on Genetic Modification, 2002), possibly giving strategies that do not serve the original purpose.

How to Establish Generic Workplace Values

Deriving an extensive list of important values pertinent to co-op is relatively easy. However, many terms used for particularly values partially or whole overlap with other terms. Deriving a shorten list (e.g., 4-6 values) of important core values relevant to one's own community of practice is more difficult. Keown, Parker and Tiakiwai (2005) suggesting adopting a 'tenting' approach, using high level abstract terms that give some flexibility to suit the context to which it will be applied and can be unpacked to additional 'sub-values'. For example, 'respect' could be unpacked to tolerance, acceptance, self-control, admiration, fairness, commitment, kindness, politeness, encouragement, and self-respect. Research needs to be carried out in the context of each of the relevant communities of practice to determine commonality among the values these communities seek. A research approach, similar to that for exploring competencies (Coll, Zegwaard, & Hodges, 2002; Hodges & Burchell, 2003; Zegwaard & Hodges, 2003), using a range of terms derived from the literature, could be used.

How Could Co-op Facilitate the Teaching of Values?

The teaching of values needs to consider on two important aspects; transferring knowledge of established values systems and the practice of such value systems. Goodman and Lesnick (2001) go further by arguing that little would be gained if education shapes the action without shaping the person, thus co-op practitioners would need to consider beyond the practice of value systems (action) and explore how students could also adopt such value systems (shaping). Recently, in co-op circles, Goodman and Lesnick's thinking was paralleled by the argument that co-op students should not only know what is right but also develop 'moral courage' to do what is right (Ayling, 2006).

If students arrive at university morally mature and with an established value system, as argued by Davis (2002), co-op may have little to teach them about values but yet plenty to teach them about the practice of values. However, when considering the ills of today's society, both Snook (2000) and Hill (2004), and it seems also the NZ Ministry of Education, argue that students (and society generally) have still much to learn about values that focus on the betterment of society.

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The rationale for students learning (and adopting) the community of practice's value system would be based on the premise of 'this is the environment you are heading towards so you should learn its value system now'. Students should then at least strive to have outcomes that are consistent with the relevant community of practice's value system. In addition, using the approach of presenting and discussing the community of practice established core values avoids the tricky situation of imposing one's own personal value system that may conflict with a student's pre-established value system, which they have every right to hold.

The methods of teaching values could involve using a pure didactic process of passing knowledge directly to the students before the placement occurs, engaging students to reflect on their own experiences in the workplace, and/or using relevant case studies. In the case of reflecting on workplace experiences, work placements present a wealth of opportunities, allowing students to explore their own experiences by their observations and the feelings/empathy experienced at the time. Using case studies is also useful as these could be explored before students are faced with making workplace moral decision (Meizrow, 1991; Pritchard, 1992). Well-known 'paradigm cases' are already being used and includes examples such as Chernobyl Nuclear Plant Explosion, Ford Pinto Petrol Tank Scandal (Perlman & Varma, 2002) and 1986 Space Shuttle Disaster due to the O-Ring failure (Reid, 2002).

Could Values be Assessed in the Workplace?

Assessing a student's value system is inherently problematic because what value system students adhere to cannot be directly seen nor can it be determined how committed they are to this value system. In addition, assessing a value system requires a pre-judged decision on what value system is 'most correct', which will most certainly unleash a torrent of criticism. However, it could be argued that outcomes from decisions made that require moral judgment are assessable, based on the observational judgments from workplace supervisor much in the way work performance is currently assessed. For example, a workplace supervisor should be able to comment, from observation of the outcomes, on a student's ability with patience, self-confidence, desire for accuracy, respect for others, and honesty.

CONCLUSIONS AND IMPLICATIONS

It is time for co-op practioners to seriously look at adopting a form of values education as part of the delivery of placement programs. Work placement presents a wealth of opportunities to explore the practice of making ethical or moral decisions. Students are likely to relate well to exploring the practices they have observed in the workplace as they would likely have personally been involved, allowing them in-depth insight. As these co-op students become graduates and commence their careers, they will inevitable be faced with making important decisions based on adherence to a value system. The challenge for co-op practioners is to determine the core values that are important to each relevant community of practice and then being able to present these to students to explore. Establishing these core values will require exploring views of the members of each of the communities of practice. Ultimately, it is important for co-op to included values education in the delivery of the placement programs because having co-op graduates well-informed and rehearsed in making good ethical and morally sound decisions not only places these graduates in a position of high integrity, it would also make a positive contribution to the overall operation of their community of practice.

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Key tools to measure student enculturation into science and understanding of the research process: writing it down rather than writing it up

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BACKGROUND

This study is part of a larger project looking at whether work placements have an impact on the enculturation of students into the science work place (Dalgety, Zegwaard, McCurdy & Coll, 2003). In this section of the research we focused on the use and understanding of Vygotskian tools as presented by Hodson and Hodson (1998) and Resnick, Saljo, Pontecorvo and Burge (1997) in particular, a report, a laboratory book and a literature review. The research also looked for evidence if the use of these tools enhanced students' understanding of the science research process and their preparedness for graduate degrees.

CONTEXT

Participants were chosen from all graduate and postgraduate students enrolled in the School of Science and Engineering at the University of Waikato who had also previously completed either a non-co-op BSc or a co-op BSc(Tech). The sample was purposively designed to ensure a range of academic subject areas, degree programs and types of organization where the students completed their work placement. The participants used in this research consisted of 18 science students (8 males & 10 females) who were currently enrolled in either an MSc or a PhD degree, and one having recently completed a masters degree and working full-time. Twelve of the participants had placements of varying durations (co-op participants), while five did not have work placements as part of their undergraduate degree (non-co-op participants). All students were at varying stages of completion in their graduate (two-year masters degree), or postgraduate study (three-four year PhD).

AIMS

The research questions were:

1. What is the understanding students have of each of the Vygotskian tools?
2. Was their understanding influenced by work placements? and
3. Has this understanding had an impact on students' ability to use the tools and understand the tools in graduate study?

METHODS

Semi-structured interviews were conducted and were around 45-60 minutes in length. A list of specified questions had been established before the interview. The questions allowed enough flexibility to explore responses and interesting comments further (Coll & Chapman, 2000; Wiersma & Jurs, 2005). In naturalistic inquiries the wording of the questions may have varied depending on the interview progress (Guba & Lincoln, 1994). The interviews were recorded and then transcribed verbatim. Data were analyzed using a thematic analytical approach (Cohen, Manion & Morrison, 2000), where key responses from each student were noted for each question. For the current area of research, students were asked to explain their understanding of the various terms retrospectively (as undergraduates and pre-placement) and currently (as graduate students or post-placement).

RESEARCH FINDINGS

Report

At undergraduate and non-placement level all students had limited understanding of what a report was and what it should contain and most thought it was a short piece of work likely to relate to laboratory reports of some kind. Students who had experienced a placement had a more professional attitude to

reports, where reports had a more defined structure and the format and content were flexible depending on the audience. Understanding of what a report is appears to be less developed both structurally and in content for students who had experienced no placements, likely due to more limited communication requirements, that is, reporting to funding agent or supervisors only. All non-placement students' ideas had developed well beyond the undergraduate level with some recognizing quality in reports, that is, what is a good and complete report.

Laboratory Book

Undergraduates all had similar views on what a laboratory book was, something where you filled in the gaps, before or while you attended a laboratory class. In other words it is used and regarded as a teaching aid and something submitted for grading, therefore, neat and tidy. During placements the laboratory book evolved far beyond a teaching aid into an essential tool that was used to collect raw data, record experiments and treatments, planning, questions, reflection and in some cases evidence for patent application, and can also be commercially sensitive intellectual property. Laboratory books were no longer taken home and written up for neatness preparatory to assessment. Several students noted that their laboratory book extended beyond an actual book to include computer programs for data entry and analysis. Similar attributes were afforded to laboratory books by the second year masters students but notably until practical research began, these students perception of laboratory books remained similar to students at undergraduate level.

Literature Review

At undergraduate level students generally had a poorly defined understanding of a literature review. Some students thought it may have been reading and writing a brief review of one scientific journal article. For placement students the understanding that a literature reviews as an integral part of the research process was apparent as many had to incorporate a literature review in their placement reports. There was an appreciation that a literature review placed the current project within the greater science context and provided essential knowledge of a specific research area. Similarly, graduate students who had undertaken their second-year masters, (the thesis writing year), also had a highly developed understanding of the literature review but this was absent from non-co-op students who had not started their thesis writing.

CONCLUSIONS AND IMPLICATIONS

The use of Vygotskian tools is well recognized as a means of personalizing learning and understanding (Hodson & Hodson, 1998; Resnick, Saljo, Pontecorvo & Burge, 1997), and little research has been published in this area at tertiary level. Technical reports, literature reviews and laboratory books are essential tools in the science workplace and this research indicates that placements (and thesis work) allows for a greater understanding of these tools which is critical for developing research ability. These results also indicate that understanding of science concepts and context develops along a continuum related to engagement with research. While at undergraduate level all students have minimal understanding of these tools and their uses in the science arena, as they progress through their degrees they develop a clearer knowledge and skill base. While most participants showed evidence of developing greater understanding, placement students developed this comprehension earlier in their careers and often had a far deeper or wider understanding of the tools due to their exposure to real science' real engagement with the research process and a variety of roles through their placements. This level of engagement was not apparent in non-co-op students until they had undertaken a research project as second-year masters students and beyond. The research supports the hypothesis that placements enhance students' research skills and better prepare these students for graduate research.

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Development of a competency based work-integrated learning program to facilitate science, engineering and technology retention in South Africa as a developing country

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BACKGROUND

Developing countries are experiencing a flight of technology (Khan, 2004), where individuals with transportable skills are leaving the workplace or their country. This tendency denudes the immediate competency base of industry and commerce. The prevalent diminished level of competencies associated with graduate engineers entering the industry and their ability to support an existing and rapidly expanding societal infrastructure is particularly problematic in South Africa. The reasons are manifold, within our current imperatives as elucidated by Turton and others (see, DuToit & Roodt, 2009; Turton, 2008), and supported by the engineering press in related articles (Creamer media, 2009; Dhliwayo, 2009). The author seeks to translate these national imperatives into the electrical power sector (McDonald, 2009; Munasinghe, 1989; Spalding-Fetcher, 2003) where technical competence and its necessity are to be appreciated. Continuity of electric supply, impacts on all strata of modern society in both essentialities and convenience. In January 2008, South Africa experienced a predicted shortfall of its electrical power generation capacity with subsequent major power outages, enforced reduction in consumption, leading to a national annual growth rate reduction, conservatively estimated as between two and five percent. These consequences are ameliorated by the world-wide economic down-turn, and the current local investment in new power generation capacity. Against this back-drop, South African universities of technology place their engineering students as trainees in industry.

PROGRAM ISSUES

Engineers in South Africa are either trained in classical universities within a BSc (Eng) program or at technical universities under a BTech (Eng) program. In the former, academic graduation is superseded by a period of internship in the engineering industry. In the latter, a preceding period of work-integrated learning [WIL] is incorporated in the academic program. Both qualifications are rated and assessed in terms of the South African Qualifications Authority (SAQA). The disparity existing between the programs and foci of engineering cooperative education, associated with the respective engineering qualification, is evident in the professional status awarded. The Engineering Council of South Africa accords the BSc(Eng) with a *PrEng* status (i.e., Professional Engineering), whilst the BTech(Eng) is accorded *PrTech* status (i.e., Professional Technologist). This disparity of professional status is rooted in the academic training period within the notional hours mandated for academic accreditation. The BSc(Eng) is classified as a four-year qualification, and the BTech (Eng) a three-year qualification. The latter, however, consist of three years of academic training followed by one year of work-integrated learning. This work-integrated learning as classically defined, managed and assessed within the universities of technology, is thus at the heart of the problem in terms of ill-defined academic outcomes, and hence is not professionally recognized. The department of Electrical Power Engineering at Durban University of Technology adopted a strategy to address the academic accreditation of the one year of work-integrated learning. The department, in consultation with local industry, developed a competency-based system, that is wholly in compliance with the minimum academic requirement of our peer institutes, and also incorporates important pedagogical features to enhance academic accountability.

CHALLENGES AND INTERVENTIONS

The approach used to facilitate the establishment of competency development in engineering trainees in industry through an academic lens, focused on the learner and the training provided. As the academic qualification awarding entity, and member to the accepted tri-party alliance of the universally understood cooperative education community, we had to facilitate appropriate methodologies to foster the expected competencies.

Competence as defined and supported in current literature, and as reflected amongst other by Boyatzis (1982), Coll, Zegwaard and Hodges (2002), and Spencer and Spencer (1993) may be thought of as an individual's underlying personal characteristics that facilitates superior performance in a given situation. Allied to this definition is the contextual relationship to the individual's attributes to achieve competency (Birkett, 1992). Capability is viewed by Rudman (1995) as a precursor to competency. Considering the previous precepts the author argues here that an holistic approach be taken in that competency be further considered as "the required response to ensuring that a task is completed with due diligence to the task at hand and the expected outcome."

Whilst focusing on the competencies to be developed in the engineering trainee, we as the academic partner had to apply due diligence in setting up a meaningful system in facilitating that academically-measurable competencies could be developed in the industry. Academic competencies were established using the National Qualification Framework contained in the South African Qualifications Framework documentation. WIL within South African universities of technology comprises two six month training periods. The first referred to as P-1 is pegged at gaining NQF-5 competencies. The second period, called P-2, is targeted in achieving NQF-6 competencies.

In terms of available literature (SAQA; ECSA) our department has standardized the outcomes logically and rather simplistically to comprise:

- NQF-5 - Considered as theory enhanced reporting, by integrating theory and practical skills. The operative buzz-word being *Why*?. At this level the trainee in industry develops the confidence of hand skills allied to the profession; and
- NQF-6 - This level comprise the cumulative effect of the NQF-5 skills transferred to real-world applications in terms of engineering problems and their solutions or to the elevated realms of technical problem synthesization, simplistically referred to as *What if*?

The major challenge experiences was that all practical industrial training was leveled at NQF-4, and thus in-appropriate for tertiary education. However, practical training, *per se*, must start with the basic elements of doing physical work, whence through the process in skills accumulation, progresses through confidence and when allied with theory enhanced reporting, is translated into the NFQ-5 standard. Challenges in meeting our requirements were in, developing a meaningful generic documentary system for registration and the compilation of trainee generated reports; and assessing and validating the actual training being conducted.

UNIQUE FEATURES AS DISCUSSIONS AND ARGUMENTS

The following unique features as presented in this paper focus on the mechanisms of facilitate the trainee's insight in questioning the prior learnt theory in terms of the technology presented in the industry, with the following being indicative within the program:

- The program establishes a prior approved registration system in which the competencies to be developed by the trainee in the industry are indicated and agreed upon by all parties comprising the cooperative education tri-party association;
- The WIL registered trainee conducts the specified training in industry and completed an academic portfolio in which the outcomes of the learning experiences are assessed by the academic department;
- Practical training of the trainee during the mandated period yields academically-equitable outcomes, commensurate with a one year project in industry, negating the academic professional registration issue, discussed above;
- The program facilitates a permanent cognitive mindset in the trainee which should translate into a knowledgeable engineer, adept in the intricacies of engineering problem solutions. Such a mindset is arguably perceptive to ingenuity and innovation; and
  The program facilitates appropriate reporting structures to facilitate the establishment of a 'portfolio of learning', which is required for presentation in respect of a professional society application.

IMPLICATIONS

The program in its uniqueness in South Africa has no current academic references in support or in dispelling this program. The author supports and argues the veracity of this program in terms of the feedback obtained from the participants.

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Time Set Reversible Challenge - Respondents

Considered with initial rejection, but on mature reflection on the competency validating benefits, respondents support the system. In this arena our success rate is in excess of 80% as gauged by interviews conducted in industry during P-2 WIL visitations.

Departmental Past Student and Industrial - Respondents

Within this grouping of practicing engineering professionals our program has overwhelming support which translates into meaningful training opportunities and employment prospects. Unfortunately no ideal program exists which meets exclude all challenges with two issues being identified as inhibiting the acceptance of our program to the wider South African universities of technology community. In South Africa, universities of technology exist as academically-autonomous institutions, meaning there may be lack of motivation to adopt our program by some academics. Discussion is needed with higher academic authorities in order to gain support for the structure presented here in ameliorating the professional registration disparities.

CONCLUSIONS

The paper presented in terms of competency development could be adapted to suite most cooperative education programs to facilitate competency based outcomes that are measurable against a known academic standard. Our complete system of document and student information as presented in this paper is available on our website for inspection and comment (see http://cs.dut.ac.za/bonnet/wil).

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