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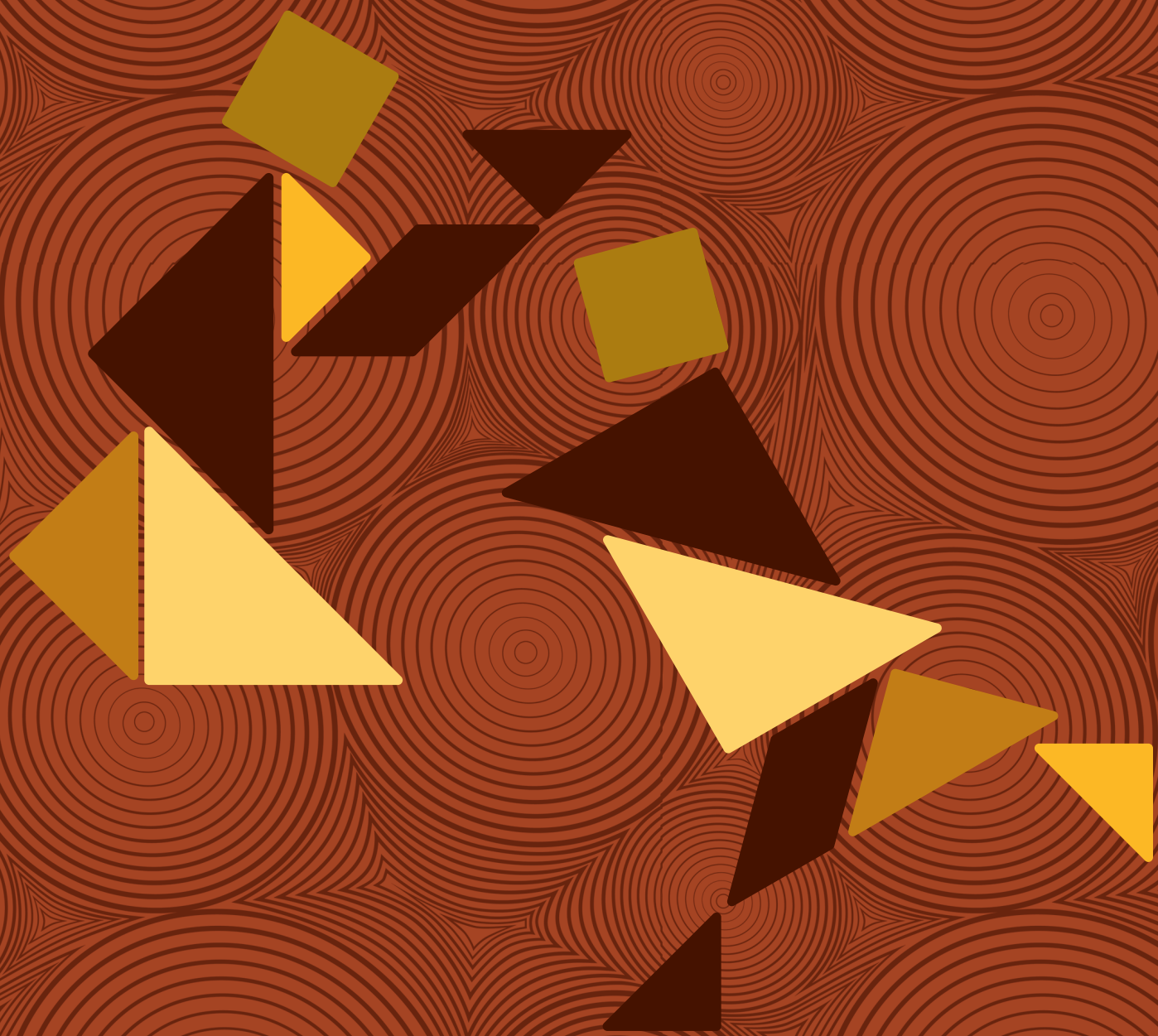

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CONTENTS

When Dan Cayse, Rodney Miller, and Peggy Harrier approached us in April of 2010 to take responsibility for the long standing *CEIA Journal of Cooperative Education and Internships* we were certainly excited at the prospect. The *Journal* has been around for forty five years with a long history of talented editors at the helm. Coming in as their successors was both exciting and humbling.

As we began to think about what we felt was most important as a next step in the development of this historic publication, one key decision was immediate. We felt that the *Journal* would most definitely benefit from being open access. Having as wide a distribution of information as possible would be critical for success. Road blocks do not stimulate scholarly inquiry. With this we wanted to ensure that the *Journal of Cooperative Education and Internships* would become an important vehicle for anyone with an interest in work integrated learning. As times are changing, so is scholarly media.

With open access as our first decision, the second was equally made in recognition of a changing and evolving world. We knew that success would require that the *Journal* become international, bringing together the best minds from around the world. In order to accomplish this, we approached key professional organizations with a request to partner with CEIA. The *Journal* is now co-sponsored by the World Association for Cooperative Education, the Canadian Association for Cooperative Education, and the Australian Collaborative Education Network. This partnership is extremely exciting as the wide foundation will support turning the Journal into an internationally viable scholarly force.

As the initial decisions were made, we continued to convene a strong editorial board. With recognized scholars from the USA, Canada, Europe, and Australia on board we began in January of 2011 to assemble this very issue. In this process we are very much indebted to both the board and the reviewers. Without their contributions this issue would not have been possible. They have been most instrumental in setting the academic tone for the publication.

We look forward to the continued evolution of the *Journal of Cooperative Education and Internships* and hope to make this a scholarly forum that advances the field one issue at a time.

Warmest Regards,

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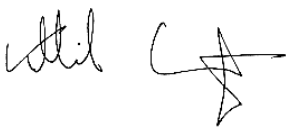

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Transforming 21st Century Corporate-University Engagement: From Work-Integrated Learning (WIL) to Learning-Integrated Work (LIW)

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Introduction

Today, there are 500 million Facebook users; 2 billion YouTube videos; LinkedIn is a driving catalyst across companies for knowledge sharing, professional development and networking; eBooks and iPads are growing daily; universities, albeit sometimes reluctantly, are rethinking their partnership relevance with business and society and the power of real world experiential learning such as service learning and work-integrated learning *beyond graduation*; and business is focused on building capabilities — competitive advantage by empowering the creative talents of its employees.

At first glance, you may think all of these transformational changes are about the precision, speed, and capacity of technology. Indeed, the power of information technology is pervasive in all aspects of modern society, however, what these trends reflect is a fundamental aspect of the human condition: the natural power of engagement. People want to be connected with people, ideas, and knowledge through unlimited community engagement at home, in the workplace, locally, globally and continually. Technologies are, in fact, tools of engagement inside the workplace among employees, between universities and corporations, and across the globe. It truly is a brave new world.

Indeed, the concept of engagement may be defined across a variety of contexts and organisations. This commentary examines engagement as it relates to the *changing* corporate-university partnership and what factors will be essential for the future. Underlying this concept of engagement is the premise that learning is lifelong, occurs in diverse ways, locations, and media, and that Work-Integrated Learning (WIL) is simply the predecessor for Learning-Integrated Work that continues throughout one's professional life. The synergy and potential for Learning-Integrated Work (LIW), however, will be dependent upon a revisioning of employer-university engagement.

Revisioning University Engagement

Today's universities are in transition and at a crossroads. The winds of change in the global economy, culture and society has created a dichotomy for most universities: how do they retain their traditional heritage, traditions and focus whilst aligning their mission with the rapidly changing demands of modern society. In other words, how do they enhance their value-added traditions to respond to demands for practical, real world education that is relevant, current, and translates from theory to practice into sustainable impacts. University research, service and teaching is still a critical foundation for higher education to 'push back the frontiers of knowledge' and strengthen economic development, scientific discovery, and educational empowerment. At the same time, it seems universities must rethink their traditional organisational, philosophical and operational tenants to align more closely with real world needs.

In one respect, the ivory tower institution is a concept of the past. The dominant form of university in the future will one that is a hybrid with society, acknowledging that learning and knowledge development is not nor should be an exclusive domain of universities, but that a university will be much more effective through interaction and knowledge networks. The good news is that universities are beginning to embrace this concept of 'relevance' to employer-employee needs through new models of engagement.

The university of the future (which is now) will want to be relevant, will want to see optimal impact of its research and education, will have the ambition to shape the future. This requires a university that is neither arrogant nor lacks confidence. The first and the latter lead to universities creating demarcation lines. The successful universities of the future will enjoy their interaction with society and will involve employers in education because it acknowledges that this is in the interest of all (of the students, of the employers, of the university, of society at large) and it will no longer focus primarily on the next generation academics, but rather on effective graduates that have real added value to employers and society.

Universities may embrace *Work-Integrated Learning* (WIL) as an effective educational tool, the truth is that its success depends entirely on the full involvement of employers and ideally also the government. If companies do not recognise the importance that they are partners in the educational process of their future employees, one can only have modest expectations of the success of WIL. No doubt some employers, especially those who are ambitious, who are engaged in the global war for talent and who are enlightened in recognising the quality of human capital as the main condition for competitive success, will want to be involved, but this means only a small part of students will be able to benefit from placements.

So the question is how to make sure that higher education is truly co-operative, bringing the different stakeholders together and ensuring shared responsibility. Part of the answer no doubt is to make sure that employers are engaged with the educational process, rather than just offering a small part of it, ie the placement. Engagement is a crucial part of

co-operative education and universities must actively engage employers as integral and equal partners. Though it is clear that university is the place of expertise when it comes to higher learning and that they deserve respect as such, being open to employers and seeking their involvement in the learning process through a structured dialogue should be recognised as an obvious example of mutual benefit. The university of the 21st century, in my view, should be just as conscious of its credibility in regard to employers as of its academic credibility.

In sum, universities of the future must reach out and invite employers to be integral and equal partners in the educational process, particularly in aligning (not designing) curriculum that has practical, experiential and real world relevance for employees. The path of engagement must be reciprocal rather than the one-way street of the past that always led to the university. A university education is only the first step in career development; Learning-Integrated Work (LIW) takes over where Work-Integrated Learning (WIL) left off and is a lifelong process.

From WIL to LIW: Engaging Employers as Co-Partners

At Nyenrode Business University we rarely just put any programme on the market on a speculative basis that there might be demand for such a programme. All programmes are designed in dialogue with the sector, listening to their needs. Thus the programmes are co-created. Not that employers design the curriculum — they better leave that to the experts — but to make sure that the programmes address the real requirements. In fact, at Nyenrode we go one step further: we expect that those who engage with us in such dialogue also guarantee our revenue. We ask them to underwrite the risk of developing and delivering such sector specific programmes, which is also a guarantee for us that what we do is really useful and will have real impact.

The new reality is that in order to be really successful Work-Integrated Learning will move on, at the point of graduation, into Learning-Integrated Work. When it comes to moving to higher steps on the career ladder, when it comes to moving into new areas or careers, or even just to make sure one remains in touch with new demands and insights, learning will retain its relevance. So the successful universities if the future will have to reinvent themselves as centres not just of WIL but also LIW. They will not let students leave, but will stay with them for the rest if their professional life. My own university, Nyenrode in The Netherlands, now generates two-thirds of its annual revenue from WIL and one third from LIW and I aim at changing this in the years to come to 50/50. The added benefit from this is that a university becomes less dependent on demographics, recognising that learning continues across an individual's career beyond university.

Experiential learning is an essential tool to learn to reflect on practice, putting practical experience in a theoretical context and appreciate learning not as a stage in life but as a permanent tool to success in professional life. Currently higher learning is often still too

much a matter of classroom experience of book knowledge that is not sufficiently related to reality. Though case studies are very good in spelling out that link, for many if not most understanding how the interaction can function between theory and practice in daily work is of even greater value.

Work-integrated education is a most effective tool when it comes to experiential learning. Obviously this goes beyond doing a placement or earning some credits by through a company project. The emphasis lies on the word integration, which refers not only to the support the student receives in regard to the work-experience itself but even more so in how a student is taught the process of reflection, applying analytical skills to real life situations and subsequently being stimulated to enrich the classroom environment with their real life experience.

The successful, permanent engagement of employers with higher education resulting in a truly effective structured dialogue between employers and educators, depends heavily on our ability to redefine cooperative education as a lifelong, on-going process, where students never really leave the university. In my view graduation is only the moment when Work-integrated learning shift emphasis and becomes Learning-integrated work. It is an out-dated concept that students would have all the knowledge and skills they need on the point of graduation. At Nyenrode Business University we call this Just-in-Time education to transition LIW into the mainstream philosophy of our employer engagement. How does the Nyenrode JiT philosophy work?

We have a wide range of post-experience educational programmes available, basically from middle-management upwards. Every time an alumnus or alumna needs a new level of competence, knowledge and insight they can return to his or her alma mater and add the next building block in order to be successful on the career ladder. Thus they can move up in typically six steps, with as final steps joining the board of a major company or even becoming non-executive director. These programmes not only expose students to appropriate new knowledge and skills, they also introduce them to new levels of reflection and personal development.

The Nyenrode educational philosophy is very much based on the understanding that success in professional life and even life in general is not wholly dependent on knowledge and skills but even more so on personal development: the ability to function at ever more demanding levels of the chosen profession or career. New levels of understanding how to interact with others, new levels of understanding about one's strength and how to work around one's weaknesses, new levels of understanding about shifting work-life balance in order to avoid burn-out and personal tragedy. And most importantly, that this learning is not just classroom based but actually involves residential periods, since much of these issues can be addressed only effectively through informal peer group learning. And this of course has as a major added benefit the broadening of one's professional networks with those who are in similar stages of career development.

At Nyenrode, we view engagement as multi-dimensional. We strive to build long-term, flexible partnerships with employers centered around gathering their experiential insights into curriculum development, market needs, and professional development. We also approach engagement with our students as a life-long process whereby alumni continually return to NBU for next level Just-in-Time career development, skills enhancement, and preparing themselves for senior management positions.

Moreover, we embrace technologies as tools of engagement between NBU and employers; students and employers; students with corporate employees; and faculty, students, and corporate employees with global business. An NBU education is by business for business and yet we value the engagement of students and employers from different sectors because it provides active reflection, diverse viewpoints, and an experiential interaction that enhances the quality and breath of learning inside and outside the classroom.

And finally, we engage government as essential partners to help us engage emerging labour markets and economic development needs that contribute to society. The NBU experience is not a panacea for all universities. These are simply philosophical tenants that guide our educational process that have come with inclusive dialogue and reflection.

Back to the Future: Empowering LIW Engagement

So where do we go in the future? The following summarises some keys points discussed in this commentary. They are not all inclusive to Work-Integrated Learning and Learning-Integrated Work. Perhaps, however, they will provide a few ideas for reflection and dialogue between your university-company-government office and its essential stakeholders and partners.

- Universities of the future must reach out and invite employers to be integral and equal partners in the educational process, particularly in aligning (not designing) curriculum that has practical, experiential and real world relevance for employees. The path of engagement must be reciprocal rather than the one-way street of the past that always led to the university. A university education is only the first step in career development; Learning-Integrated Work (LIW) takes over where Work-Integrated Learning (WIL) left off and is a lifelong process.
- Technologies are, in fact, tools of engagement inside the workplace among employees, between universities and corporations, and across the globe. These innovations provide immense formal and informal learning opportunities for problem solving, knowledge sharing, and communications among and between students and employees from multiple sectors.
- University engagement should foster a lifelong connection among all alumni with the university. Alumni, following the NBU model, will return to the university in various roles throughout their professional lives which benefit the individual, the university, the company, and the sector.

- The global context is an essential aspect of the university-corporate partnership and providing opportunities for students/employees to reflect and experience global work opportunities is about the real world.
- Universities and corporations must foster multi-sector interaction among its students, employees, alumni, and corporate partners. Classes with students from business, government, community organisations, education, and the general workforce make for a dynamic learning environment. The value of multi-dimensional perspectives, reflection, and problem analyses in different contexts is an invaluable component of effective education.

In the final analysis, Learning-Integrated Work will drive the business and university sectors in the future. The success of this endeavour will, to a large extent, be determined by the capacity of business and universities to co-create a dynamic and flexible strategy for the multi-dimensional components of engagement.

Development of Learning Outcomes Assessment Methods for Co-operative Education Programs

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Abstract

Education professionals are required to assess the learning outcomes of students to develop competent and highly employable graduates. The University of Windsor has recently established learning outcomes for its co-operative education programs. In order to measure these outcomes, an interdisciplinary research team has been investigating the appropriateness of existing assessment methods, and developing new reflection and assessment tools. The researchers have focused on both qualitative measures, based on student perceptions of the achievement of learning outcomes, as well as quantitative measures based on portfolio reviews, employer evaluations, and faculty feedback on work term reports. This paper describes a comparative analysis of the results for two groups; the first using old assessment tools and the second using some newly developed assessment tools, showing positive trends. The results of this study can serve as a resource for other institutions that are interested in strengthening their students' co-op experience through outcomes assessment.

Keywords: Learning outcomes, assessment, co-operative education.

Introduction

The educational strategies and learning outcomes devised to maximize students' co-operative education experiences directly influence their skills development, educational plans, and career choices as well as establish connections between universities and employers. Recently, new learning outcomes were identified for each level (i.e., junior, intermediate,

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senior) of the co-operative education program at University of Windsor (Johrendt, Northwood, Benzinger, Salintri, & Jaekel, 2007; Watters, Johrendt, Benzinger, Salinitri, Jaekel & Northwood, 2008). Corresponding new educational strategies and assessment tools were then developed for each academic level. The learning outcomes were designed to focus on specific skills and characteristics in graduates in a number of areas such as acquisition, application and integration of knowledge, research, critical thinking and problem-solving skills, and communication, interpersonal, and leadership skills. A comparative study that focused on two groups of students in the Engineering and Computer Science co-op programs was conducted to investigate the effectiveness of the new pedagogical strategies and assessment tools designed for each academic level involved in co-operative education. The first group consisted of students and alumni who were evaluated using previous tools, and the second group consisted of students evaluated using the new strategies and tools. Along the way, modifications were made to the strategies and assessment methods based on our findings. The results show improved performance in a number of key areas, such as acquisition and application of knowledge, planning and organization, critical thinking skills, and teamwork and leadership skills. These findings are being used to further refine the assessment tools and to assist in the process of developing additional learning outcomes.

The study addressed the following research questions:

1. Are the current goals/learning outcomes successfully being met (as per feedback from co-op graduates from the last five years)?
2. What new assessment methods can be developed to effectively measure the achievement of learning outcomes in co-operative education (as per a literature review and benchmarking study)?
3. Are the developed assessment tools successful in showing whether co-operative education students are achieving currently established learning outcomes (as per students currently enrolled in the program)?
4. How does the learning outcomes achievement of the second group compare with that of the first group?

Literature Review

The basic concepts of alternating school with work over a substantial portion of the student's college or university career and allowing the progression in complexity of both the academic studies and the work experiences are fundamental to co-operative education (Parsons, Caylor, & Simmons, 2005). Traditionally, employer and student performance evaluation data have been used to informally reflect on and improve student or employer performance. However, greater emphasis is now being placed on improving evaluation criteria through learning outcomes that meet the needs of co-operative education programs. Both Parsons et al. (2005) and McGourty, Sebastian, and Swart (1998) argued that outcome-driven assessment processes provide critical information to faculty and administrators on the effectiveness of the design, delivery, and direction of any education

program. Shaeiwitz (1996) added that outcomes assessments are critical to the evaluation of co-operative education programs for higher education institutions in the current competitive environment. Frye also asserted that the two growing trends to the interest of educators are assessment and accountability (Astin, 1998, Frye, 2002). Frye argued that assessment for excellence is a feedback process guiding students, faculty, departments, and administration in improving their effectiveness. Assessment for accountability, however, is a regulatory process, designed for accreditation purposes, aggregate statistics and institutional conformity (Miller, 2007, Frye, 2002). Behaviors that will maximize student learning should be incorporated into learning outcomes assessment methods, which will in turn stimulate and solidify the purpose for allowing valuable outcomes assessment.

In a large study, Besterfield-Sacre et al. (2000) identified and focused on eleven intentionally undefined outcomes of EC-2000[2] as a necessary step to better defining learning outcomes in Engineering co-operative education. Through an extensive literature review and a framework based on Bloom's taxonomy, each outcome has been expanded into a set of attributes that can then be used to adapt the outcomes to their own program. Besterfield-Sacre et al. agree that these outcomes are in a dynamic state and that it is necessary to continually update and modify them as knowledge increased about their specificity and use.

According to Cates and Jones (2000): 1) Clear expectations need to be set; 2) the tools, strategies, and instruments need to facilitate a transfer of knowledge; and 3) formative assessment is needed for student learning. Emphasizing learning outcomes necessitates an academic approach that fosters an emphasis on learning, use of academic assignments, and a workplace environment that extends learning and complements that of the academic environment. Linking academic components of co-operative education with the applications of learning theories work together to advance learning outcomes.

It is evident that practitioners have recognized the value of implementing learning outcomes in the co-operative education process. The challenge arises in creating measureable learning outcomes that include social skills development woven into the co-operative education experience. According to Mueller (2009), this assessment requires "The systematic collection, examination, and interpretation of qualitative and quantitative data about student learning and the use of that information to document and to improve student learning" (p. 7).

The Computer Science Accreditation Board (CSAB) has emphasized the importance of measurable objectives for all computer science programs, including co-operative education programs. In order for a program to receive accreditation (ABET, 2007), it is necessary that it has "documented, measurable objectives, including expected outcomes for graduates" (p. 5) and that it "regularly assesses its progress against its objectives and uses the results of the assessments to identify program improvements and to modify the program's objectives" (p. 5). The specified standards for program objectives and assessments include:

- Measurable objectives;
- the program's objectives must include expected outcomes for graduating students;

2 EC 2000 is the innovative criteria for learning outcomes and assessment designated by the Accreditation Board of Engineering and Technology (ABET). Engineering educators must first establish program and learning objectives, specify measurable outcomes, typically in terms of desired outcome attributes, and use the resultant information to make real improvements.

- data relative to the objectives must be routinely collected and documented, and used in program assessments;
- the extent to which each program objective is being met must be periodically assessed;
- the results of the program's periodic assessments must be used to help identify opportunities for program improvement; and
- the results of the program's assessments and the actions taken based on the results must be documented.

Professional organizations such as the Association for Computing Machinery (ACM) have recognized the importance of broader educational goals for computer science programs. These objectives include ethics, teamwork, communication skills, and critical thinking. The Canadian Information Processing Society (CIPS) emphasizes the goal of fostering "a co-operative approach to computer and information science education between industry, government, and educators to meet the changing needs of society" (paragraph# 12.). CIPS also specifies in its accreditation criteria (CIPS, 2009) that "a significant component of an accredited program must be practical in nature" (p. 15), and "aspects of professionalism are to be emphasized throughout the curriculum"(p. 14).

In the area of Engineering co-operative education in North America, emphasis has been placed on developing evaluation criteria through learning outcomes that meet the needs of the programs and the Accreditation Board for Engineering and Technology (ABET) or the Canadian Engineering Accreditation Board (CEAB). Research on co-operative education and Engineering students has shown a positive impact on employment earnings and grade point averages at the cost of extended education beyond the four-year program (Blair, Miller, & Hammer, 2004). According to Parsons et al. (2005) the environment of engineering education has changed over the past decade with new broader learning objectives as required in the ABET criteria. These objectives include ethics, teamwork, and critical thinking. Many of the learning outcomes in the ABET engineering criteria will be embedded in the social context within which engineering work is done. The need arises in creating learning outcomes that include social skills development woven into the co-operative education experience. While the CEAB criteria for accreditation are more prescriptive and less outcomes-based than those of ABET, there are numerous outcomes detailed in the Accreditation Criteria and Procedures (Canadian Council of Professional Engineers, 2008). These outcomes include:

- Development of an individual's ability to use appropriate knowledge and information to convert, utilize and manage resources optimally through effective analysis, interpretation and decision-making (2.1.1).
- Develop an engineer who is adaptive, creative, resourceful and responsive to changes in society, technology and career demands (2.1.3).
- Make the student aware of the roles and responsibilities of the professional engineer in society and the impact that engineering in all its forms makes on the environmental, economic, social and cultural aspirations of society (2.1.4).

- Develop the ability to function as an effective member of a team and to be able to communicate both within the profession and with society at large (2.1.5).

As pointed out by Cook and Campbell (1979), self-reported data, collected by surveys, can be affected by the subjects' ability to recall information accurately, as well as their tendency to report what reflects positively on their abilities, knowledge, and so forth. In Maxwell and Lopus (1994), the authors caution about bias in student self-reported data, since below-average students tend to inflate their academic achievements and under report inferior accomplishments. Schacter (1999) also indicated that self reported data can be rendered unreliable because of absent-mindedness of research subjects which might contribute to weakened memories of events and suggestibility (i.e. memories that result from failed expectations or unanswered questions). However, self-reported data continues to be used, in a wide range of fields, including educational (Harding, Carpenter, Finelli, & Passow, 2004), industrial (Niu, 2010), and health related (Souares, Moulin, Sarrassat, Carlotti, Lalou, & Le Hesran, 2009) research. It has been argued (Chan, 2009) that although some inaccuracies may exist, the poor-quality of self-reported data is over-exaggerated. According to Northrup (1996), validation studies over the past decades have shown that misreporting is negligible for non-threatening questions. Additionally, recent studies show that while it might be possible to provide inaccurate data on some occasions, it is almost impossible for subjects to provide faulty data on a consistent basis (i.e. human memory cannot be fallible all of the time, Chan 2009).

Research Methodology

A multidisciplinary team was assembled for this project, providing expertise in the fields of Computer Science, Engineering, Education, and Co-operative Education, as well as experiential learning. Research was conducted over several years, starting in 2007, and included alumni and student participants in the undergraduate Computer Science and Engineering programs.

The methodology involved the development of appropriate learning activities and the use of a web-based survey, in addition to faculty and employer feedback to evaluate the achievement of learning outcomes for the two groups under study.

Group 1:

- The group consisted of alumni and senior Engineering and Computer Science students (i.e. fourth year students in 2008) who had experienced the original assessment tools.
- Group 1 was evaluated using a variety of co-op assessment tools without formal learning outcomes, including former assessment tools not specifically tied to learning outcomes, such as work term performance evaluations completed by supervisors and feedback sheets from faculty and a co-op coordinator pertaining to other work term requirements (work term reports and presentations).
- A web based survey (see Appendix A) issued to the group included demographic and educational goals sections.

Group 2:

- The group consisted of 3rd or 4th year Engineering and Computer Science students in 2009 that experienced the revised learning outcomes and supporting educational strategies.
- Group 2 was evaluated using an interventionist approach comprised of revised learning outcomes assessment methods including checklists, self-assessments, peer assessments, portfolio reviews, etc. This approach featured a stronger focus on student feedback and self-reflection using several types of assessment rubrics for the portfolio, along with employer and peer assessment evaluative tools.
- The same web based survey used with the first group was also used with this group.

The new assessment tools were implemented by the co-op coordinators and used by peers, employers and the coordinators to evaluate student performance. This provided an objective approach toward understanding student performance in the program. Overall, the level of learning outcomes achievement was measured using a number of different methods, including self-reported data, faculty and employer evaluations (using a standard rubric), as well as the new assessment tools, such as co-op portfolio and reflective questions tied to co-op activities. The comparative study of learning outcomes achievement entailed an evaluation and comparison of achieved learning outcomes for the two groups under study. The primary tool of statistical analysis was SPSS, which enabled the research team to compare mean averages between the two groups, using an ANOVA test with $p < 0.05$ to determine significant differences.

Survey. In 2008, the survey was sent out to 674 Computer Science and Engineering Students and alumni who comprised Group 1. In 2009, the second survey was sent out to Group 2, comprised of 91 Engineering and Computer Science students in their 3rd or 4th year at the University of Windsor. The demographic section of the survey asked questions concerning discipline, year of graduation and type of work term (i.e. regular or extended). The second half of the survey addressed several key learning outcomes including the extent to which co-op participation developed various attributes regarding knowledge and educational skills. Responses for each question were based on a Likert scale of 1-5 where 1 = "Increased greatly," 2 = "Increased somewhat," 3 = "Had no effect," 4 = "Decreased somewhat," and 5 = "Decreased greatly." The survey also asked students open-ended questions that would facilitate improvement in the co-op program.

The complete survey included four sets of questions in the following areas: i) Awareness and development of personal skills, strengths, and goals; ii) developing attributes of a successful graduate; iii) awareness of and contribution to workplace environment; and iv) development of skills for enhancing employment opportunities (see Appendix A). This paper focuses on the second group of questions, which reflects on a set of attributes and skills, which every graduate of the program is expected to develop (University of Windsor, 2011).

This survey question asked both groups:

> To what extent did participation in the co-op program help develop the following attributes:
>
> ___ a) Acquisition of knowledge
>
> ___ b) Application of knowledge
>
> ___ c) Integration of knowledge
>
> ___ d) Research skills
>
> ___ e) Critical thinking skills
>
> ___ f) Problem-solving skills
>
> ___ g) Interpersonal skills
>
> ___ h) Communication skills
>
> ___ i) Responsible behaviour to self, others and society
>
> ___ j) Teamwork, and personal and group leadership skills
>
> ___ k) Creativity and aesthetic appreciation
>
> ___ l) Ability and desire for continuous learning

As mentioned in the literature review, self-reported data can be vulnerable to bias, where participants tend to over-report gains, as well as possible recall problems. This type of bias is typically most noticeable where subjects are reporting on their own skills, knowledge or other characteristics. However, in this survey the questions were formulated to be *non-threatening* to the subjects, and asked them to report the effectiveness of the co-op program, rather than their own levels of achievement. Therefore, based on the available literature, it is not expected that there will be a significant amount of bias in the data. In terms of recall, the focus of the questions was not specifically on what the students learned or experienced in their work terms, but rather on what effect (if any) the co-op program had on their current abilities/skills. In this context, alumni who graduated several years earlier may actually have a better appreciation of the benefits of the co-op experience. As with any self-reported data, the possibility of skewed responses is a limitation in our approach as well. However, to reduce the possibility of this occurrence, the survey questions have been formulated appropriately and the survey results interpreted in the context of the other indicators, including evaluation of structured activities and employer and faculty feedback.

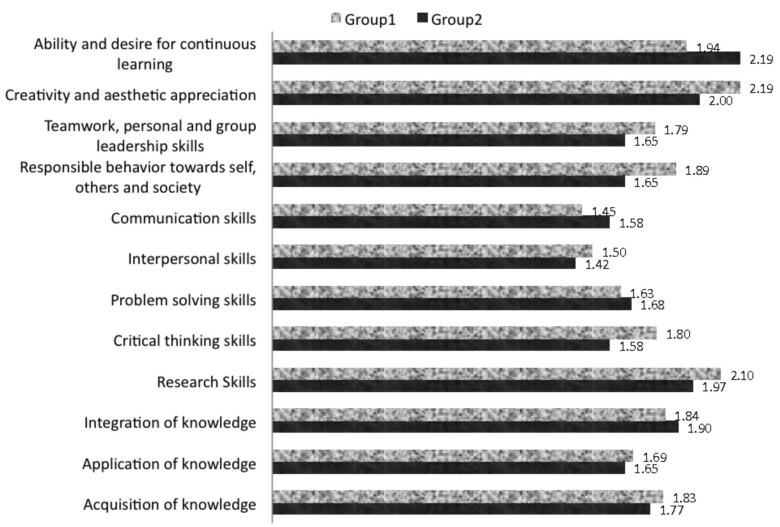
Results

The overall response rate for Group 1 was 35%. Group 2 had a similar overall response rate of 34%. Students were first asked to classify themselves according to their discipline and then to their year of graduation. Of those who submitted survey responses 21% (out of 35%) of the co-op students in Group 1 had either graduated in 2007, 2008, or were

eligible for graduation in 2009. Only 7% of students had graduated between the years of 2004-2006. Of the students who responded in Group 2, 32% were eligible for graduation in 2009 or 2010.

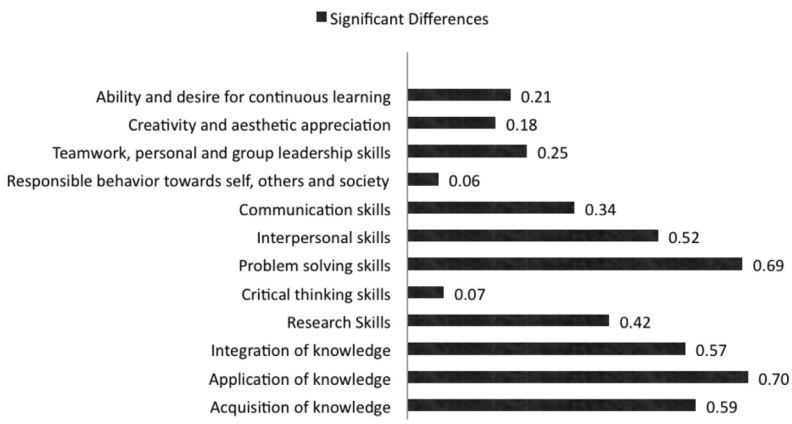
In comparing the responses of both Group 1 and Group 2 participants, it was observed that in almost every category a higher percentage of Group 2 students reported a perceived benefit from their co-op programs. Figure 1 shows a comparison of the means for the two groups. Mean values closer to 1 indicate a stronger perceived benefit due to participation in the co-op program. The most successfully achieved learning outcomes for Group 2 were "acquisition of knowledge," which had a slightly stronger mean (1.7 vs 1.8), "critical thinking skills" (1.5 vs 1.8), "responsible behavior to self, others, and society" (1.6 vs. 1.9), and "teamwork, personal, and group leadership skills" (1.7 vs 1.8). For two of the categories, "problem solving" and "integration of knowledge," the perceived success response rates were almost identical for both groups (1.6 and 1.8, respectively), indicating that there was little impact made by the new learning outcomes. For Group 2, the least successful category, in terms of the number of students who reported a perceived benefit from the co-op program, was "ability and desire for continuous learning" in which the mean was approximately 2.1 (vs. 1.9 in Group 1). In contrast, the mean response for Group 1 was strongest for "communication skills."

Figure 1. *Comparison of student responses from all students.*



This survey addressed a diverse array of learning outcomes, in which Group 2 student responses showed stronger mean values for 8 out of the 12 categories. However, the ANOVA test did not show any significant differences between the groups, with $p < 0.05$, for these categories. The closest difference was observed with "Responsible behavior towards self and others" ($p = 0.059$). "Critical thinking skills" was also close to the significance marker ($p = 0.07$). Figures 1 and 2 provide a graphical overview of the results.

Figure 2. *Comparison of significant differences between groups.*



Evaluations based on structured activities and faculty feedback. In addition to the survey sent out to the Engineering and Computer Science students, interventionist measures have been implemented to assist in the process of enhancing and assessing student learning and development. Previous learning outcomes assessment measures have been modified and collected in portfolios created by students (Johrendt et al., 2009). The portfolio has been a key instrument used in the research for evaluating the performance of students in Engineering and Computer Science who graduated in 2009, (many of whom comprised Group 2, to whom the survey was sent). The objective of the portfolio is to enable students to recognize and articulate the impact of their co-op experience on their development of skills and knowledge. It also provides co-op coordinators with a standardized, objective approach for assessing student performance in the co-op program. Students were required to include responses for reflective questions and/or structured activities, which were used as assessment measures. In addition to these, final work term reports, resumes, cover letters and faculty evaluation of the work term reports were also used. Evaluators then collected and coded the responses, using the standard rubrics, to determine if specified learning outcomes (see Appendix B) were achieved. The responses were coded, using a number-valued Likert Scale, ranging from 1 – 5 (1 = "poor evidence of achievement," 2 = "satisfactory," 3 = "good," 4 = "very good," 5 = "excellent"). Assessment rubrics for resume, cover letter and interview skills are included in Appendix C, Appendix D and Appendix E, respectively. In cases where portfolios did not include the assessment measures, a scale range of 9 was assigned to indicate that the information was "Missing." The data was further analyzed with SPSS, using T-tests, and the results indicated significance at $p<0.05$.

Faculty evaluation of the final work term report was one measure used to assess students' ability to incorporate academic theory with workplace practice (LO#1 in Appendix B). The faculty followed a detailed rubric which is included in Appendix F. All 28

students included in this assessment measure were logged as being able to successfully incorporate theory into their work terms.

Another learning outcome (LO#2 in Appendix B) addressed the extent to which students achieved greater clarity regarding academic and career goals. For this evaluation, a summative reflective assignment played a significant role by asking students to reflect critically on how their learning outcomes and expectations had changed; 15 out of 21 students who included this information in their portfolios were assessed as having experienced some degree of change. The second measure for this outcome asked students to reflect on how their career objective changed from when they initially created their portfolios. Results showed that 24 of 26 students who included this information were reported as having experienced change in their career objective. The last reflective question, for this learning outcome, asked students to reflect on the use of the portfolio in assisting in their career development process. Out of the 27 (69%) students who included a response, 23 (i.e. over 85% of the respondents) indicated that their portfolios helped them in their career choices.

Results suggest that the portfolio is a valuable assessment tool that contributes to experiential learning development. By incorporating a series of qualitative end questions, coordinators can acquire subjective feedback from students. The use of reflective measures can also prove beneficial to enhancing the co-op program's learning outcomes by offering coordinators a more in-depth and objective understanding of student development in the work place. Using the portfolio as an assessment tool therefore incorporates student, faculty, employer, and co-op staff involvement, giving everyone a chance to contribute to the student's learning experience and the assessment thereof.

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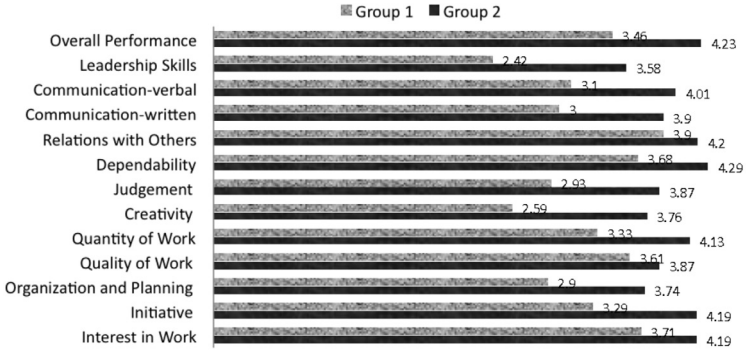
Evaluations based on employer feedback. The final component of the evaluation provides information on the achievement of learning outcomes, based on employer feedback. Figure 3 shows a mean comparison of Employer Evaluation Tools both before and after development of learning outcomes. For this portion of the study, mean values closer to 5 indicate a higher level of achievement. As noted in the graph, the post-development evaluation tools provided improved outcomes for the students in most areas of evaluation. By conducting a t-test of the means, it was found that there was a significant difference ($p < 0.05$) between the pre-evaluation tool and the post-evaluation tool (applying learning outcomes design) in 10 out of the 13 categories. Two of the remaining three categories (written communication: $p = 0.063$; and verbal communication: $p = 0.068$) were close to the significance marker.

Figure 3. *Comparison of employer evaluations for the two groups.*

Mean Comparisons of Employer Evaluation of Co-op Student Work Performance



Analysis of the Results

This research sought to examine the effectiveness of the assessment tools in achieving the specified learning outcomes. As mentioned earlier, the first group was only able to benefit from basic tools such as evaluation and feedback sheets provided by the co-op coordinator and the employer. In contrast, the second group was able to utilize a plethora of assessment tools such as self and peer-assessment sheets, a portfolio review that enabled personal reflection, and a series of rubrics and checklists that guided them through the co-op process. The data for each group was analyzed using an ANOVA test in order to assess the strength of the means between the two groups. In determining the strength of the means for the survey results, ranges closer to 1 were considered to be very strong, while means higher than 1 were considered to be weak. The results show that revised learning outcomes evaluation tools enhance co-operative education. This is indicated by the comparative analysis of self-reported student input as well as evaluations done by employers. In terms of student responses to survey questions, both percentages of individual responses and mean differences indicate that students in the second group reported seeing a greater positive impact from their co-op experience for 9 out of the 12 categories. The mean differences were particularly significant for "critical thinking skills" and "responsible behavior to self and others." The only categories where students from Group 1 reported a significantly higher positive impact from the co-op program are "communication skills" and "ability and desire for learning." The results from employer evaluations were even stronger. Group 2 students consistently scored higher for all categories, and these differences were significant for 10 out of the 13 categories. Based on these initial results, it is reasonable to conclude that the new assessment tools have a positive contribution toward enabling students to achieve the specified learning outcomes. Currently, a longitudinal study is being carried out on new co-op students to confirm whether this trend continues.

Based on observations throughout this project, it appears that in many cases when students are provided with clearer assessment criteria, they are able to strategically evaluate themselves. In addition, evaluation methods that possess a subjective component enable them to reflect upon their learning process throughout the co-op program. This suggests that learning outcomes assessment methods enable students to constructively use feedback to strive for excellence in their performance.

The enhancement of assessment tools was strategic in the overall success of Group 2's performance, which supports the belief that the use of several assessment tools enables a more thorough evaluation of student performance and therefore learning outcomes development. Students should be assessed through a variety of methods that are not only objective but also subjective so that they can reflect on their performance and make necessary adjustments that will foster growth. The addition of the reflective component may also explain the improved employer evaluations for Group 2 students, since this assessment tool also enhances the students' learning experience. Effectiveness of the assessment tools is also dependent upon the specific learning outcomes examined. In this project, those outcomes reflected educational, social, and personal aspects of student growth. Some mean responses were stronger for learning outcomes that examined educational development, such as acquisition of knowledge, which was assessed by self-evaluation forms and portfolios. For other successfully achieved outcomes, such as critical thinking and research skills, assessment methods used by the second group included rubrics and checklists. Social learning outcomes such as interpersonal skills, teamwork and group leadership skills, and responsible behavior to self, others, and society were assessed by employer evaluation and peer assessment sheets. For most learning outcomes in which students felt that they were improving, there were assessment methods to address them.

Students should be assessed through a variety of methods that are not only objective but also subjective so that they can reflect on their performance and make necessary adjustments that will foster growth.

It was previously noted that there were also instances where the means of Group 1 responses were stronger than the experimental group responses (such as communication skills and ability and desire for learning). In these cases, it is arguable that there needs to be improvement of assessment tools and/or educational strategies that address these learning outcomes, as they are important to the co-op evaluation process. Particularly in considering research skills, it was observed that responses were consistently low in both groups. It may be worth considering the effectiveness in examining this outcome as it pertains to various co-op disciplines. That is, coordinators must determine which learning outcomes are important for students in specific disciplines.

Limitations of the Study

A noteworthy limitation is the difference in the sample sizes between groups 1 and 2. Group 1 consisted of a larger pool of students within a five year period, including alumni students who had graduated as far back as 2003, to a (then) current set of students in 2008. All of these students used the same learning outcomes and it was presumed that reviewing such a large sample would provide a more valid and substantial study. On the other hand, the experimental group consisted of a smaller sample group of students from one year (2009). While these students had used the learning outcomes through their co-op experience, they would have been able to recall the impact of the learning outcomes. However, the fact that this group consisted of only students from one year versus the control group, which consisted of students over five years, may have, to some extent, impacted the results.

Another limitation surrounds the reliability of self reported data. As explained earlier, human memory is fallible, which might result in exaggeration or over-reporting of information which can create a bias. Because of this hindrance, it would be expected that the results might have been skewed, since satisfied students would report positively and dissatisfied students might report negatively. The ability to objectively assess one's performance in achieving the outcome is therefore a minor issue that needs to be considered when planning future research methods.

Finally, a single person did the evaluation of the student portfolios. This could lead to subjective bias, even though a standard rubric was used. For our continuing evaluations, at least two evaluators will assess each portfolio.

Conclusions and Future Work

In conclusion, this research study raises the question about whether or not the current assessment tools require revision and if revision is required systematically. In answering, one must consider the dynamic nature of the learning process and of learning outcomes. While this study has revealed that the revised assessment tools were necessary for improving co-op performance, it is this dynamic state of learning that may mean constantly revising the learning outcomes in place so that the co-operative education program will continue to thrive. The insights gained from this research will be useful in examining the strength of assessment methods for co-operative programs, which will further help to modify and develop a framework for better learning outcomes. Continuous revision of evaluation methods will directly benefit students by providing them with appropriate resources and tools necessary to integrate classroom theory with practical applications and enrich their educational experience. Additionally, other methods of data collection must be employed in order to reduce bias and error.

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Appendix A

SURVEY QUESTIONS

QUESTION 1

For the following question, please refer to the scale below to indicate your answers.

1 = Increased greatly

2 = Increased somewhat

3 = Had no effect

4 = Decreased somewhat

5 = Decreased greatly

To what extent did participation in the co-op program affect the following:

___ a) Your academic motivation

___ b) Your clarity regarding academic goals

___ c) Your clarity regarding career goals

___ d) Identification of personal strengths related to academic options

___ e) Identification of personal weaknesses related to academic options

___ f) Identification of personal preferences related to academic options

___ g) Identification of personal strengths related to workplace options

___ h) Identification of personal weaknesses related to workplace options

___ i) Identification of personal preferences related to workplace options

___ j) Your understanding of theories taught in the classroom

___k) Your technical knowledge in your field

QUESTION 2

For the following question, please refer to the scale below to indicate your answers.

1 = Increased greatly

2 = Increased somewhat

3 = Had no effect

4 = Decreased somewhat

5 = Decreased greatly

To what extent did participation in the co-op program help develop the following attributes:

___ a) Acquisition of knowledge
___ b) Application of knowledge
___ c) Integration of knowledge
___ d) Research skills
___ e) Critical thinking skills
___ f) Problem-solving skills
___ g) Interpersonal skills
___ h) Communication skills
___ i) Responsible behaviour to self, others and society
___ j) Teamwork and personal and group leadership skills
___ k) Creativity and aesthetic appreciation
___ l) Ability and desire for continuous learning

QUESTION 3

For the following question, please refer to the scale below to indicate your answers.

1 = Increased greatly
2 = Increased somewhat
3 = Had no effect
4 = Decreased somewhat
5 = Decreased greatly

To what extent did participation in the co-op program develop in you:

___ a) An understanding of workplace culture
___ b) An understanding of employee health and safety information in the workplace
___ c) A network of contacts within your field
___ d) The ability to make an effective contribution in the workplace

QUESTION 4

For the following question, please refer to the scale below to indicate your answers.

1 = Increased greatly
2 = Increased somewhat
3 = Had no effect
4 = Decreased somewhat
5 = Decreased greatly

To what extent did participation in the co-op program affect your employment opportunities by:

___ a) Enabling you to identify, assess and develop workplace skills and personal competencies
___ b) Teaching you how to write an effective resume and cover letter
___ c) Teaching you how to interview effectively
___ d) Assisting in the process of career planning
___ e) Contributing to your post-graduation employment

Appendix B

Measures for Learning Outcome (LO) #1: *Integrated Classroom Theory with Workplace Practice*

Final Work Term Assessment (WTA) Question (Q): How do the skills & knowledge you gained during your work term relate to your academic program? (portfolio or wtadbase) 1=Poor evidence (no relationship expressed) 2=Satisfactory evidence (student articulated one to two general links) 3=Good evidence (student articulated multiple general links) 4= Very good evidence (student articulated multiple links with specific examples)	
Faculty Evaluation of Final Work Term Report –Incorporation of academic theory (Student Final Assessment Package) 0=unacceptable/missing; 1=satisfactory; 2=good; 3=excellent	
Change Over Time in Faculty Evaluations of Work Term Report – Incorporation of academic theory (Portfolio and /or student file) 1=no change over time; 2=satisfactory change; 3=significant change	

Measures for LO #2: *Greater Clarity Re: Academic & Career Goals*

Change in Learning Objectives Between Terms (Portfolio) 1= very little change; 2=some change; 3= substantial change	
Summative Reflective Assignment Q: Look back at the statement of objectives you listed in your Learning Contracts over your co-op work terms and discuss whether or not your learning expectations and outcomes have changed. How have they changed, or why do you feel that they have not changed? (Portfolio) 1= very little change ; 2=some change; 3= substantial change	
Statement of Career Objective & Plan (Portfolio) 1=Poor (incomplete, broad); 2=Satisfactory (specific, directional, action-oriented, some detail); 3=Good (specific, directional, action oriented, highly detailed)	
Reflective Assessment Q: How has creating your portfolio helped you in the career development process? (Portfolio) 1=poor demonstration of growth; 2=satisfactory demonstration of growth; 3=strong demonstration of growth	
Reflective Ass. Q: Has your career objective changed from when you first created your portfolio? (Portfolio) 1= very little change; 2=some change 3= substantial change	
Reflective Assessment Q: How has creating your portfolio helped you in the career development process? (Portfolio) 1= very little help; 2=some help; 3= substantial help	

Measures for LO #3: *Workplace Professional & Employment Readiness Knowledge & Skills*

Change in Resume (Portfolio)*: 1= very little change; 2=some change; 3= substantial change	
Initial Resume Score based on rubric (Portfolio)*: 1=poor; 2=fair, 3=good, 4=excellent	
Final Resume Score based on rubric (Portfolio): 1=poor, 2=fair, 3=good, 4=excellent	
Cover Letter Score: IERR (Portfolio or student file): 1=poor, 2=satisfactory, 3=good, 4=very good	
Interview Score: IERR (Portfolio or student file): 1=poor, 2=satisfactory, 3=good, 4=very good	
Change in Employer Final Evaluation Over Time (Portfolio): 1= very little change, 2=some change, 3= substantial change, 4=consistently strong	
Final WTAQ: Hypothetically, would you consider hiring this student back for another work term? (Wta dbase): 1=yes, 2=no	
Reflective Assessement Q: What skills or attributes have you improved from your first work term to now? (Portfolio) 1= little development reported; 2= some development reported, 3= strong development reported	
Reflective Assessment Q: What changes have you noticed in your resume? (Portfolio) 1= little development reported; 2= some development reported; 3= strong development reported	

*May not be available

Appendix B *(continued)*

Measures for LO #4: *Greater Understanding of Workplace Culture*

Final Employer Evaluation of Work Performance Element: Relations with Others (Final Assessment Package) 1=unable to comment; 2=difficult, 3=occasionally difficult, 4=mostly harmonious, 5=congenial and helpful 6=always works in harmony with others	

Measures for LO #5: *Created and maintained network of contacts in field*

Networking Assignment: Business Cards (Portfolio) 1= poor demonstration (fewer than 5 cards, only one organization) 2=satisfactory demonstration (five cards, at least two organizations) 3=good demonstration (6-10 cards, 3-5 organizations)	
Networking Assignment: Info Interviews (Portfolio): 1= poor demonstration of learning 2=satisfactory demonstration of learning 3=good demonstration of learning	
Reference List (Portfolio) 1= poor demonstration(fewer than 3 references, only one company) 2=satisfactory demonstration (3 references, two companies) 3=good demonstration (3 references, three companies)	

Measures for LO #6: *Made an Effective Contribution to the Workplace*

Final Work Term Assessment Q: If you were to rate this student's work performance or ability, would it be: (Portfolio or wta dbase) 1=poor, 2=satisfactory, 3=good, 4=very good, 5=excellent, 6=exceptional	
Final Employer Evaluation of Performance (Student Final Assesment Package) 1=Unable to comment, 2=Unsatisfactory, 3=Marginal, 4= Satisfactory, 5=Very Good, 6=Outstanding	

Appendix C

RESUME ASSESSMENT RUBRIC

	VERY GOOD	GOOD	SATISFACTORY	POOR
FORMAT	RESUME FOLLOWS SPECIFIED RESUME FORMAT (INCLUDING REVERSE CHRONO-LOGICAL ORDER) EASY TO READ/ CLEAN/APPEALING FONT AND FORMAT ARE CONSISTENT. NO SPELLING/ GRAMMAR MISTAKES	RESUME FOLLOWS SPECIFIED RESUME FORMAT (INCLUDING REVERSE CHRONO-LOGICAL ORDER) EASY TO READ/ CLEAN/APPEALING FONT AND FORMAT ARE CONSISTENT. A MAXIMUM OF 1 SPELLING OR GRAM-MAR MISTAKE	RESUME FOLLOWS SPECIFIED RESUME FORMAT (INCLUDING REVERSE CHRONO-LOGICAL ORDER) EASY TO READ/ CLEAN/APPEALING. FONT AND FORMAT ARE NOT CONSISTENT, BUT STILL READABLE. MORE THAN 1 SPELLING/GRAMMAR MISTAKE	RESUME DOES NOT FOLLOW THE SPECIFIED RESUME FORMAT. FONT AND FORMAT ARE NOT CONSISTENT AND NOT READABLE. MANY SPELLING/ GRAMMAR MISTAKES
EDUCATION SECTION	ORGANIZED, CLEAR AND WELL DEFINED. FORMAT IS CONSISTENT AND HIGHLIGHTS PERTINENT INFORMATION. SECTION INCLUDES: INSTITUTION WITH ITS LOCATION, GRADUATION DATE, MAJOR, DEGREE, GPA AND ANY RELEVANT COURSEWORK	ORGANIZED, CLEAR. SECTION INCLUDES: INSTITUTION WITH ITS LOCATION, GRADUATION DATE, MAJOR, DEGREE. OTHER RELEVANT INFORMATION IS MISSING, SUCH AS RELEVANT COURSEWORK, GPA ETC.	NOT ORGANIZED OR CLEAR SECTION INCLUDES: INSTITUTION WITH ITS LOCATION, GRADUATION DATE, AND MAJOR. DEGREE AND OTHER RELEVANT ACADEMIC INFORMATION NOT INCLUDED. FORMAT IS INCONSISTENT	THIS SECTION IS MISSING THE MOST CRUCIAL INFORMATION. INSTITUTION IS LISTED WITHOUT LOCATION. GRADUATION DATE IS NOT LISTED. MAJOR IS LISTED BUT NOT DEGREE. OTHER RELEVANT INFORMATION IS MISSING
EXPERIENCE SECTION	THIS SECTION IS WELL DEFINED AND INFORMATION RELATES TO THE INTENDED CAREER FIELD. PLACES OF WORK, LOCATION, TITLES AND DATES ARE INCLUDED FOR EACH POSITION. DESCRIPTIONS OF DUTIES ARE RELATED TO THE CAREER FIELDS AND USE ACTION VERBS. THIS SECTION SHOULD BE DIVIDED INTO RELATED AND OTHER EXPERIENCE.	DESCRIPTIONS ARE CLEAR IN THE FORM OF BULLET STATEMENTS BEGINNING WITH ACTION VERBS. DESCRIPTIONS ARE NOT DETAILED ENOUGH TO FULLY UNDERSTAND AS IT PERTAINS TO THE INTENDED CAREER FIELD. PLACES OF WORK, LOCATION, TITLES AND DATES ARE INCLUDED FOR EACH POSITION.	DESCRIPTIONS ARE NOT IN THE FORM OF BULLETS BEGINNING WITH ACTION VERBS. COMPLETE SENTENCES IN PARAGRAPH FORM ARE USED TO DESCRIBE POSITIONS. PLACES OF WORK ARE INCLUDED FOR EACH POSITION BUT NOT LOCATIONS, DATES AND TITLES.	THIS SECTION IS NOT WELL DEFINED AND THERE IS NO ORDER TO THE DESCRIPTIONS OF EACH POSITION. DESCRIPTIONS ARE NOT DETAILED AND OFFER NO UNDERSTANDING OF THE WORK COMPLETED AND HOW IT RELATES TO THE INTENDED CAREER FIELD. NO LOCATIONS AND DATES OF EMPLOYMENT ARE LISTED.
HONORS/ ACTIVITIES	THIS SECTION IS WELL ORGANIZED AND EASY TO UNDERSTAND. ACTIVITIES/HONORS ARE LISTED AND DESCRIPTIONS INCLUDE SKILLS GAINED AND LEADERSHIP ROLES HELD. DATES OF INVOLVEMENT ARE LISTED	THIS SECTION INCLUDES ALL NECES-SARY INFORMATION BUT IS DIFFICULT TO FOLLOW. LEADERSHIP ROLES WITHIN THE ORGA-NIZATION ARE LISTED BUT SKILLS ARE NOT DEFINED. DATES OF INVOLVEMENT ARE LISTED.	THIS SECTION IS MISSING KEY INFORMATION SUCH AS LEADERSHIP POSI-TIONS HELD OR DATES OF INVOLVEMENT. ORGANIZATIONS ARE LISTED DESCRIBING THE ORGANIZATION, NOT THE INDIVIDUAL INVOLVEMENT.	THIS SECTION IS MISSING OR CONTAINS VERY LITTLE INFORMATION. ORGANIZATION TITLES OR DATES OF INVOLVEMENT ARE NOT LISTED. NO DESCRIPTIONS ARE LISTED.
OVERALL RATING	GIVEN IF ALL AREAS ARE VERY GOOD.	GIVEN IF 3 OUT OF 4 AREAS ARE AT LEAST GOOD.	GIVEN IF 3 OUT OF 4 AREAS ARE AT LEAST SATISFACTORY.	GIVEN IF 2 OR MORE AREAS ARE RATED POOR.

Appendix D

COVER LETTER ASSESSMENT RUBRIC

	VERY GOOD	GOOD	SATISFACTORY	POOR
FORMAT	LETTER USES CORRECT BUSINESS FORMAT WITH DATE AND ADDRESSES AT THE TOP AND A SIGNATURE AT THE BOTTOM. THE LETTER IS CLEAR AND CONCISE AND GRAMMATICALLY CORRECT. THERE ARE NO SPELLING ERRORS. LETTER ADDRESSES THE CONTACT PERSON IN THE SALUTATION.	LETTER USES CORRECT BUSINESS FORMAT WITH DATE AND ADDRESSES AT THE TOP AND A SIGNATURE AT THE BOTTOM. THERE ARE MINIMAL GRAMMAR AND SPELLING ERRORS. THIS LETTER IS DECENT IN CONTENT BUT DOES NOT CONVINCE AN EMPLOYER TO CALL. LETTER ADDRESSES THE CONTACT PERSON IN THE SALUTATION.	LETTER USES CORRECT BUSINESS FORMAT BUT WITH ONLY ONE ADDRESS AT THE TOP AND SIGNATURE AT THE BOTTOM. THERE ARE MINIMAL GRAMMAR AND SPELLING ERRORS. LETTER DOES NOT ADDRESS THE CONTACT PERSON, BUT, RATHER TO SIR/MADAM OR HIRING MANAGER.	BUSINESS FORMATTING IS NOT USED IN THE LETTER. THERE IS NO ADDRESS OR DATE AT THE TOP AND THE LETTER IS NOT SIGNED. THERE ARE MANY GRAMMATICAL AND SPELLING ERRORS. THE CONTENT OF THE LETTER DOES NOT MAKE SENSE TO THE READER.
PARAGRAPH 1: INTRODUCTION	THIS SECTION IDENTIFIES THE PURPOSE OF THE COVER LETTER (THE POSITION YOU ARE APPLYING FOR). YOU HAVE DESCRIBED HOW YOU HEARD ABOUT THE OPENING. THIS SECTION IDENTIFIES WHY YOU ARE INTERESTED IN THE COMPANY AND DEMONSTRATES RESEARCH ABOUT THE COMPANY. WORDING IS CREATIVE AND CATCHES AN EMPLOYER'S ATTENTION QUICKLY.	THIS SECTION IDENTIFIES THE POSITION YOU ARE SEEKING. THIS LETTER DOES NOT DESCRIBE HOW YOU HEARD ABOUT THE OPENING. YOU VAGUELY DESCRIBE WHY YOU ARE INTERESTED IN THE JOB AND THERE IS VERY LITTLE COMPANY RESEARCH. THIS SECTION IS BLAND AND MIGHT NOT CATCH SOMEONE'S ATTENTION FAST ENOUGH.	THIS SECTION IDENTIFIES THE POSITION YOU ARE SEEKING. THIS LETTER DOES NOT DESCRIBE HOW YOU HEARD ABOUT THE OPENING, AND DOES NOT DESCRIBE WHY YOU ARE INTERESTED IN THE JOB, NOR IS THERE ANY COMPANY RESEARCH EVIDENT. THIS SECTION IS BLAND AND MIGHT NOT CATCH SOMEONE'S ATTENTION FAST ENOUGH.	THIS SECTION DOES NOT CLEARLY IDENTIFY WHAT POSITION YOU ARE SEEKING. THERE IS NOT DESCRIPTION OF HOW YOU HEARD ABOUT THE POSITION, WHY YOU ARE INTERESTED IN THE JOB, NOR IS THERE COMPANY RESEARCH. THIS LETTER DEFINITELY WILL NOT GRAB AN EMPLOYER'S ATTENTION AND KEEP THEM READING.
PARAGRAPH 2: IDENTIFICATION OF SKILLS AND EXPERIENCES AS RELATED TO THE JOB DESCRIPTION	THIS LETTER IDENTIFIES AT LEAST ONE OR TWO OF YOUR STRONGEST QUALIFICATIONS AND CLEARLY RELATES HOW THESE SKILLS APPLY TO THE JOB AT HAND (FEATURES –BENEFITS APPROACH)	THIS LETTER IDENTIFIES ONE OF YOUR QUALIFICATIONS BUT IT IS NOT RELATED TO THE POSITION AT HAND. THE LETTER RESTATES WHAT IS ON YOUR RESUME WITH MINIMAL ADDITIONAL INFORMATION. THE FEATURES-BENEFITS APPROACH IS NOT EFFECTIVELY UTILIZED.	THIS LETTER IDENTIFIES ONE OF YOUR QUALIFICATIONS BUT IT IS NOT RELATED TO THE POSITION AT HAND. THE LETTER RESTATES WHAT IS ON YOUR RESUME WITH MINIMAL ADDITIONAL INFORMATION. THE FEATURES-BENEFITS APPROACH IS NOT EFFECTIVELY UTILIZED.	THIS LETTER DOES NOT DISCUSS ANY RELEVANT QUALIFICATIONS. YOU HAVE NOT RELATED YOUR SKILLS TO THE JOB YOU ARE APPLYING FOR.
PARAGRAPH 3: CLOSING	THIS LETTER REFERS THE READER TO YOUR RESUME OR ANY OTHER ENCLOSED DOCUMENTS. THIS LETTER THANKS THE READER FOR TAKING TIME TO READ THE LETTER AND LISTS HOW YOU MAY BE CONTACTED FOR AN INTERVIEW	YOU THANK THE READER FOR TAKING TIME TO READ YOUR LETTER. YOU REFER THE READER TO YOUR RESUME OR OTHER APPLICATION MATERIALS. YOU DO NOT LIST HOW YOU MAY BE CONTACTED FOR AN INTERVIEW.	YOU THANK THE READER FOR TAKING TIME TO READ YOUR LETTER. YOU REFER THE READER TO YOUR RESUME OR OTHER APPLICATION MATERIALS. YOU DO NOT LIST HOW YOU MAY BE CONTACTED FOR AN INTERVIEW.	YOUR LETTER DOES NOT THANK THE READER FOR TAKING TIME TO REVIEW THE LETTER. THERE IS NO REFERENCE TO A RESUME OR OTHER APPLICATION MATERIALS. YOU DO NOT LIST HOW YOU MAY BE CONTACTED FOR AN INTERVIEW.
OVERALL RATING	GIVEN IF ALL AREAS ARE VERY GOOD.	GIVEN IF 3 OUT OF 4 AREAS ARE AT LEAST GOOD.	GIVEN IF 3 OUT OF 4 AREAS ARE AT LEAST SATISFACTORY	GIVEN IF 2 OR MORE AREAS ARE RATED POOR.

Appendix E

INTERVIEW ASSESSMENT RUBRIC

	VERY GOOD	GOOD	SATISFACTORY	POOR
APPEARANCE	PROFESSIONAL ATTIRE – BUSINESS SUIT	PARTIAL BUSINESS ATTIRE	BUSINESS CASUAL	CASUAL/ INAPPROPRIATE ATTIRE
EYE CONTACT	MAINTAINS EYE CONTACT WHILE ANSWERING	MAINTAINS SOME EYE CONTACT	MAINTAINS VERY LITTLE EYE CONTACT	DOES NOT LOOK AT INTERVIEWER AT ALL
BODY LANGUAGE/ POSTURE	APPEARS POISED, NO FIDGETING	SOMEWHAT NERVOUS, MOVEMENT IN SEAT	APPEARS NERVOUS, VERY ACTIVE POSTURE IN SEAT	EXTREMELY NERVOUS, JERKY AND REPETITIVE MOVEMENTS
SELF-AWARENESS	EXCELLENT ARTICULATION AND WELL THOUGHT OUT ANSWERS	MODERATE ABILITY TO COMMUNICATE/ ARTICULATE	SOME DIFFICULTY IN ARTICULATING AND FORMING RESPONSES	UNABLE WITH PROMPTING TO ADEQUATELY ANSWER QUESTIONS AS THEY ARE ASKED
PROFESSIONALISM	POLITE, KEEN AND EXPRESSES ENTHUSIASM, POSITIVE ABOUT PREVIOUS EXPERIENCE AND OPPORTUNITY AVAILABLE	POLITE, KEEN AND EXPRESSES ENTHUSIASM, VALUES THE OPPORTUNITY THE COMPANY CAN PROVIDE THEM	POLITE, KEEN, BUT SOMEWHAT VAGUE ABOUT HOW THIS POSITION AND COMPANY CAN ASSIST THEM WITH THEIR FUTURE	UNCOMFORTABLE AND RESENTFUL OF THE NEED FOR AN INTERVIEW
MARKETABILITY	HAS HAD SIGNIFICANT CAREER RELATED WORK & EXTRA-CURRICULAR EXPERIENCE, AND/OR IS ABLE TO EFFECTIVELY COMMUNICATE SKILLS & EXPERIENCE	HAS HAD GOOD WORK AND EXTRA-CURRICULAR EXPERIENCE, AND/OR IS ABLE TO EFFECTIVELY COMMUNICATE SKILLS AND EXPERIENCE	HAS HAD AVERAGE WORK AND EXTRA-CURRICULAR EXPERIENCE, AND/OR IS SOMEWHAT ABLE TO COMMUNICATE SKILLS AND EXPERIENCE	HAS HAD NO WORK AND EXTRACURRICULAR EXPERIENCE, AND/OR CANNOT COMMUNICATE SKILLS AND EXPERIENCE

Appendix F

WORK TERM REPORT RUBRIC

WORK TERM REPORT EVALUATION FORM
-FACULTY-

Student Name:_____ **Student Number:** _____
Co-op Program:_____ **Work term:**_____

	Missing	Poor	Satisfactory	Good	Very Good	Comments
STRUCTURE/FORMAT						
➢ Title Page	☐	☐	☐	☐	☐	_____
➢ Letter of Submittal	☐	☐	☐	☐	☐	_____
➢ Table of Contents	☐	☐	☐	☐	☐	_____
➢ List of Tables and Figures	☐	☐	☐	☐	☐	_____
➢ Executive Summary or Abstract	☐	☐	☐	☐	☐	_____
➢ References/Appendices	☐	☐	☐	☐	☐	_____
➢ Overall Appearance	☐	☐	☐	☐	☐	_____
CONTENT						
• Introduction	☐	☐	☐	☐	☐	_____
• Problem/Issue	☐	☐	☐	☐	☐	_____
• Logic of Discussion	☐	☐	☐	☐	☐	_____
• Use of Evidence/Details	☐	☐	☐	☐	☐	_____
• Integration of Graphics, Tables	☐	☐	☐	☐	☐	_____
• Incorporation of Academic Theory	☐	☐	☐	☐	☐	_____
• Recommendations	☐	☐	☐	☐	☐	_____
• Conclusions	☐	☐	☐	☐	☐	_____
WRITING SKILLS						
➢ Grammar/Mechanics	☐	☐	☐	☐	☐	_____
➢ Clarity/Style	☐	☐	☐	☐	☐	_____
➢ Overall Writing Skills	☐	☐	☐	☐	☐	_____

OVERALL RATING

☐ **Pass** ☐ **Fail** – student must re-submit to the Co-op Office
Please indicate specific areas that must be corrected:

_____

- May the student meet with you if unclear as to revisions? **Yes** ☐ **No** ☐

EVALUATOR'S COMMENTS:

_____

Would you recommend this journal be set aside as an outstanding example to inspire other students?

☐ **I authorize the Centre for Career Education to provide the student and, where necessary, appropriate faculty members with a copy of this form.**

Name: _____ _____ **Signature:** _____ **Date:** _____
Form Revised: August 28, 2009

Where's WIL? Including work-integrated learning in descriptions of what it is that academics do

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Abstract

Australian universities are embracing work-integrated learning (WIL) and as a result, delivering WIL has become a key component of academic work. In light of its increasing popularity, it is surprising that WIL is often missing from accounts of what university lecturers do and tends to be valued less when compared to other academic activities such as research, face-to-face teaching, community engagement and governance. This article examines this oversight. A case is made for recognizing WIL as distinct from and of equal importance to other day-to-day academic tasks, and including WIL in common descriptions of academic work roles.

Keywords: Work-integrated learning, academic work roles.

Introduction

Work-integrated learning (WIL), also understood as work experience in industry, cooperative education, and field education, is now crucial to what happens in Australian universities. To a significant extent, this has been driven by legislative and policy changes that seek to improve the *work-readiness* of higher education graduates to meet industry and labor market demands (Bradley, Noonan, Nugent, & Scales, 2008; Commonwealth of Australia, 2009a, 2009b; Patrick et al., 2009). Universities have been encouraged to implement WIL and have demonstrated an eagerness to do so; yet accounts of university educator's work roles have not kept pace and generally omit the delivery of WIL (Coaldrake & Stedman, 1999; Hall, 2002; Orrell, 2004). Proponents of quality WIL also observe that it tends to be less valued compared to other academic pursuits such as research, face-to-face teaching, community engagement, and governance and they argue that, as a consequence, WIL educators do not attract sufficient resources and support (Boud & Solomon, 2001; Cooper & Orrell, 1999; McCurdy & Zegwaard, 2009; Noble, 1999; Patrick et al., 2009). This article examines the absence of WIL in the literature that articulates what it is that academics do and argues for its inclusion.

Re-evaluating common descriptions of university educators' work in such a way that recognizes the significance of WIL is important for a number of reasons. WIL is the key strategy adopted by universities to produce the work-ready graduates demanded by employers. However, delivering WIL in ways that achieves this does not just happen; it takes dedicated resources and, in particular, knowledge, skill, time, and effort of university staff. It is with this in mind that the capacity of academics to provide quality WIL opportunities could be improved as a result of appreciating and valuing the work involved. There is also general agreement in the literature that WIL is under-resourced and Patrick et al. (2009) argued that finding ways to better resource and develop more enabling policies to encourage effective WIL should be priorities (Cooper, Orrell, & Bowden, 2010; Weisz & Smith, 2005). Moreover, including WIL in accounts of what university lecturers do may go a long way toward securing a fair share of organizational esteem and resources for WIL educators.

This article begins by describing the policy landscape and other drivers which have elevated WIL to being fundamental to the function of universities in Australia. In contrast, a report on the omission of WIL from descriptions of what it means to be a university lecturer is provided as are the ways in which WIL is mistakenly likened to teaching campus-based face-to-face units and generally mistreated as a less than significant addition to the day-to-day work of university educators. An argument for recognizing WIL as a distinct activity for academics of equal importance to research, face-to-face teaching, community service, and administration is made. While this article draws mainly on Australian experiences and material, WIL is well established worldwide and the arguments are relevant to other contexts (Coll & Eames, 2004). This article will be of interest to educators involved in delivering WIL as well as others responsible for managing universities and who appreciate and want to capitalize on the educational, economic, and institutional benefits of good WIL.

WIL has been an integral component of education within some disciplines in Australia for quite some time and recent legislative changes and policy shifts are expanding its presence and significance in universities.

The Advance of WIL in Universities

WIL has been an integral component of education within some disciplines in Australia for quite some time and recent legislative changes and policy shifts are expanding its presence and significance in universities. Patrick et al. (2009) suggest WIL is an umbrella term for a range of approaches and strategies that integrate theory with the practice of work within a purposefully designed curriculum. The most common approach is workplace-based placements, and other strategies include industry engaged project work, work environment simulations and virtual activities. Field education was institutionally embedded in youth work, social work, education and nursing well before the current impetus on universities to deliver WIL (Bryson et al., 1986; Weber, 2000). Patrick et al. (2009) argued universities are under growing pressure from government, industry, professions, and the community to respond to skill shortages by producing a work-ready professionalized workforce with the requisite *employability skills* who can meet the needs of a rapidly changing economy (Cleary, Flynn,

Thomasson, Alexander, & McDonald, 2007; Precision Consultancy, 2007). The 2008 review of Australian higher education advocates for universities to do more in terms of preparing a highly productive workforce capable of meeting the needs of the labor market (Bradley et al., 2008; Department of Education, Employment & Workplace Relations, 2010). Moreover, the Rudd and Gillard Labor Government's *Education Revolution* continues a trend visible in the *Higher Education Support Act 2003* as well as the Howard Liberal Government's *Skills for the Future* policy interested in enhancing the role of universities in generating graduates who are work-ready (Commonwealth of Australia, 2009a; Hansard, 2006; O'Connor, 2008). Marginson (2002) identified the expectation that Australian universities provide the growing number of professionals needed for nation building and the workforce is not new and *investment in human capital* was a major reason for government investment in the higher education sector from the mid-1950s to the late 1980s. What is new is the increasing role and influence of industry in shaping the policy agenda and that WIL is a key strategy governments, industries, and universities are now embracing to realize it.

Given this interest in and demand for WIL, it comes as little surprise to find WIL is now mainstream in Australian universities (McLennan, 2008). For example, WIL is often a priority in institutional strategic directions and regularly features in university marketing strategies (Australian Council for Educational Research, 2008). Many universities are also obliging all discipline areas to implement WIL. Charles Sturt University (2007), Flinders University (2008), Griffith University (2006), and RMIT University (2008) are cases in point, embracing these developments with the introduction of policies requiring WIL activities be embedded in programs and courses. The Australian Government is also directing how WIL is to be done within universities. Since 2005, universities have had to actively provide direction to students' learning and performance when engaged in WIL to be eligible for associated funding (Bates, 2008). The *Higher Education Support Act 2003* and accompanying administration guidelines, which were most recently updated in 2009, specify the requirements (Department of Education, Employment and Workplace Relations, 2009). The criteria relate to the level of oversight, direction and management that universities need to provide and include improving and formalizing the support given to students on placement as well as the educational content, standards of performance to be achieved, and assessment of student learning within such units (Atkinson, Rizzetti, & Smith, 2005). Patrick et al. (2008) argued the policy changes are forcing Australian universities to comply and deliver practicum courses that are consistent with the criteria to receive direct public funding. At the same time, WIL has been mainstreamed within Australian universities: Have descriptions of what is means to be a university lecturer kept pace?

WIL is Missing from Common Descriptions of Academic Work

Popular accounts of what university lecturers do generally omit WIL and there are numerous explanations for this oversight. According to Hall (2002), academics do teaching, research, service or community engagement, and administration or governance. Others who have written about the day-to-day work of lecturers suggest a similar list of activities

(Bowden & Marton, 2004; Larkins, 2008; McInnis, 1999; Visser-Wijnveen, Driel, Van der Rijst, Verloop, & Visser, 2010). All too often WIL fails to rate a mention. One reason for the omission could be the fairly recent mainstreaming of WIL and Universities Australia (2007) acknowledges WIL has not traditionally been university 'core business'. Common descriptions of the academic role found in the literature have subsequently not kept pace. However, Boud and Solomon (2001) identified what many areas of university-based professional education can demonstrate that WIL in higher education is not new. Other reasons that WIL is not included in accounts of academic work roles deserve attention.

Popular accounts of what university lecturers do generally omit WIL and there are numerous explanations for this oversight.

Another explanation for the exclusion of WIL from descriptions of what university lecturers do is that the official functions of WIL are typically at odds with what many argue the purposes of universities should be. The expansion of WIL is being driven by higher education policy that is specifically shaped by economic imperatives and, in particular, the interests of business and industry. Moreover, employers expect universities to produce graduates who are *fully employable* and university executives are embracing WIL to achieve *work-readiness*, *skills* and *productivity* agendas (McIlveen et al., 2008). The way in which universities have taken up these agendas and employed WIL to achieve them has attracted criticism in so much as it limits the role of WIL to vocational preparation and skills development, reducing higher education to "advanced vocational training," and positioning universities as a'"job placement agency" (Billet, 2009; Hall, 2002, p. 25). In other words, a focus on such utilitarian interests and vocational outcomes is viewed as contrary to university's traditional mission of the creation and advancement of knowledge, as well as its dissemination for the common good (Harman & Treadgold, 2007; Marginson, 2007). Further, and following Larkins (2008), WIL within the contemporary Australian higher education system is officially designed to *develop human capital* and produce employable and productive workers rather than critically engaged citizens capable of deep intellectual thought and who have a commitment to the pursuit of knowledge to advance the broader collective good (Johnston, 2007; Weisz & Kimber, 2001). An education led by labor market requirements and business demands, and which focuses on the acquisition of specific technical skills, is also far different from the more emancipatory, humanistic, moral, and civic processes and outcomes many suggest should characterize what a university education is all about (Grubb & Lazerson, 2004; Nussbaum, 1997, 2010). These discrepancies could be reasons for the omission of WIL in academic role descriptions.

On a similar note, WIL can be seen to undermine what many perceive to be legitimate academic work. Drawing on Foucault, Hall (2002) argued "the impulse to question, reinterrogate, unsettle, and dissipate familiarities should drive our work as intellectuals" (p. xviii). Similarly, Chomsky suggests intellectuals enjoy a unique privilege and responsibility to "speak the truth and expose lies" (Chomsky & Peck, 1987, p. 60; Said, 1996). While such activities are not inimical to delivering WIL, the official functions and practices of WIL are not framed within a discourse interested in critical reflective practice or intellectually

driven scholarly and public pursuits. Marginson (2002) also identified a *crisis of academic identity*, evident by a "destructive stand-off between academic cultures and the culture of corporate management," (p. 420) that has been brought on by the corporatization of internal university systems and cultures. Marginson fails to mention knowledge, a point not missed by Boud and Solomon (2001) who argued that WIL reduces the status of universities as the primary producers of knowledge and disrupts their monopoly over knowledge production because of its reliance on, and close relationships with, the world outside higher education institutions, in particular industry and employers. WIL is officially aligned with corporate interests within and beyond higher education institutions which treat knowledge as a commodity that needs to have a commercial benefit to be of worth. Drawing on Coaldrake and Steadman (1999), WIL also confronts issues of academic territory and independence because it requires negotiation over issues of ownership and design of curriculum, matters traditionally exclusively determined by academics. The marginalization of WIL in what it means to be an academic could be one way the tension between management and academic imperatives has been manifested.

The esteemed status of research and publishing in universities provides a further explanation for the marginalization of WIL. Spencer and McDonald (1998) claimed that field education is disadvantaged within the research-oriented culture of universities; a point echoed by Lager (2004) and reiterated over a decade later by Cooper, Orrell, and Bowden (2010). Similarly Clarke (2006), McGrail, Rickard, and Jones (2006), McInnis (1999) and Hall (2002) argued research and publishing are the privileged and *value-determining* component of academics' professional lives, attracting a disproportionate amount of academic charisma, prestige, income and career opportunities for universities and lecturers compared to other pursuits, and this includes WIL. This puts into a context the observation made by Cooper and Orrell (1999) that WIL staff sacrifice their academic careers in order to deliver WIL. Marginson (2007) also identified that it is research performance that drives many of the university global ranking schemes, and WIL generally fails to be included as a criterion in data-gathering processes. Actually, staff that specialize in WIL often do not have the time or capacity to generate research income or publications and this can inadvertently diminish the reputation of universities in league tables that cover only a small fraction of university activities. In other words, research and publishing are positioned as academic core business and, as a result, WIL is sidelined and not recognized as academic work.

Another reason why WIL is not recognized as a core academic activity could be the intensification of academics' workloads that has taken place over the same period that successive Australian governments have been inadequately funding universities. In other words, the workloads of academics are already complex, diverse and full without the inclusion of WIL, and this is not helped by universities being cash strapped and lecturers having to do more with less. Recent workforce audits have revealed considerable increases in work for academics. For example, Universities Australia reported staff-to-student ratios have *blown out*

from 14 to 1 in the early 1990s to be sitting at around 20 students for every teacher in 2006 (Larkins, 2008). Universities Australia also identified the diversity of university lecturers' everyday work, of which higher teaching loads are but one component. They argue there are increasing expectations on academics to generate innovative research, secure external research funding, publish, and supervise post graduate students as well as perform other activities such as teaching, community service and university governance. This has taken place in the context of a decline in full-time tenured lecturer positions and the deteriorating state of public funding for higher education in Australia (Organisation for Economic Cooperation and Development, 2005). Such developments have also occurred in the context of the expanding delivery of WIL. In the absence of sufficient funding for universities, WIL has been marginalized.

A different way of understanding the absence of WIL from accounts of academic work roles is the assumption that it is similar to delivering conventional campus-based face-to-face courses or units and that teaching adequately encompasses WIL. For example Devlin and Samarawickrema (2010), Hall (2002) and Marginson (2002, 2007) appeared to collapse WIL into being just another method of teaching. The Australian government's recent higher education policy initiatives also fail to specifically name WIL, although there are numerous references to improving and expanding innovative teaching and learning as well as student's learning experiences and it can only be assumed these statements are meant to capture WIL (Commonwealth of Australia, 2009a, 2009b). However, proponents of quality WIL argued it is a significantly different method of education requiring particular institutional structures as well as distinct knowledge, skills, time, and effort from academics (Bennett, 2008; Cooper, Orrell, & Bowden, 2010; Patrick et al., 2009). As reported in the literature, there are multiple and diverse relational, curriculum, pedagogical, legal, ethical and administrative challenges and obligations entailed in the delivery of WIL courses (Billet, 2009; Britzman, 2003; Coll & Eames, 2004; Johnston, 2007; Orrell, 2004). Boud, Solomon, and Symes (2001) added that WIL educators need to consider learner and setting together, unlike other forms of educational provision that try to disengage learners from the settings in which they operate. Spencer and McDonald (1998) also identified that the delivery of field education stands outside the traditional tertiary mode in both teaching and administration. This includes the need to negotiate and sustain dynamic on-the-ground and ever-changing partnerships between various stakeholders: Universities, employers, professional associations, and students. The *Higher Education Support Act 2003* and accompanying administration guidelines also acknowledged university managed WIL as a discrete practice that not only requires academics to do a series of tasks specific to the delivery of student placements, but also a distinct funding formula that differs from how other units of study are to be financially supported. Such observations and practical measures indicate WIL is not the same as teaching on-campus units and therefore should be included as a separate activity in descriptions that characterize the work of academics.

WIL Deserves to be Included in Descriptions of What it Means to Be An Academic

There are good reasons to recognize the distinctiveness and merits of WIL. For example, WIL has educational and scholarly worth. Coll and Eames (2004) and Patrick et al. (2009) argued WIL is a valid pedagogy and legitimate educational strategy. Atkinson et al. (2005) and Boud and Solomon (2001) identified the learning outcomes attributed to WIL are broader than those generally found in classroom-based courses. Well structured, WIL can also provide the valuable educational experience required for developing expert intellectual and practical capabilities typically required of effective and ethical professionals, such as the ability to make rational, ethical, and complex judgments in unpredictable and *unknown situations* (Billet, 2009; Bowden & Marton, 2004; Johnston, 2007; Tynjala, Valimaa, & Sarja, 2003). WIL also exposes students to significant direct consequences for their immediate decisions and actions, whereas the implications of what happens in the classroom can be less critical (Bates, 2008). As a result, it is through WIL that practice and its effects can be appreciated, examined, and explored in ways not available to units delivered solely on-campus (Lager, 2004). Moreover, WIL can complement and enrich university-based professional education and enhance the quality of all university learning.

WIL is also being drawn upon to assist Australian universities in what Marginson (2002) described as their "position and strategy in a global context" (p. 414). WIL relies on industry and employers who are able to offer opportunities for workplace-based placements. Australia's strong economic performance, including during the recent global financial crisis, puts it in a better position than other countries of delivering a steady supply of work placements. This puts the country's higher education system in a good position to further capitalize on marketing innovative, well-supported, and quality WIL as a distinctive attribute (Cooper, Orrell, & Bowden, 2010). Marginson (2002) argued Australian universities need to seek competitive commercial advantage in the global education market and that the best way of achieving this is by producing a product that is unique. Improving the recognition of WIL could contribute toward expanding it as an attractive specialization of the Australian higher education system and help universities profit from the institutional and commercial benefits of effective WIL.

WIL is also able to make a unique economic, social, and cultural contribution to Australia. The Australian government is, once again, interested in using universities as a principal tool for a modern day nation building exercise, particularly in relation to achieving a knowledge-based economy, developing human capital and improving social inclusion (Commonwealth of Australia, 2009a, 2009b). WIL is a technique that can be drawn on to make a significant contribution to reforging and restrengthening this renewed partnership and synergy between nation and university (Marginson, 2002). WIL can also assist the higher education sector with improving the access, participation and outcomes for students, which is a key objective of the Federal government's higher education policy reforms (Australian Council for Educational Research, 2010). Birrell, Healy, and Smith (2008) also claimed that it is university educated graduates, with specialist knowledge and professional

capacities, that are needed to address apparent skill shortages within the Australian labor market. If this is accurate, then among the various academic pursuits WIL is in a unique position to be able to deliver on this.

Formalizing WIL in academic position descriptions may also encourage much needed research activity in this area. It is reasonable to assume that if WIL is invisible in accounts of what university lecturers do then the need for research is also unlikely to be recognized. Cooper et al. (2010) argued WIL has become a vital higher education enterprise; however, it has been, for the most part, under-researched and under-theorized. Research could go a long way toward capturing, understanding, evaluating, and improving the diverse purposes and practices of WIL as well as enhancing potential benefits for the range of stakeholders involved. Cooper et al. (2010) identified a burgeoning WIL scholarly community that has an interest in doing just that and which could be bolstered by the recognition of WIL as a key component of academic work.

WIL offers unique opportunities for universities, students, governments and employers and it appears it is here to stay as a distinctive feature of Australian higher education and an integral component of academic work.

Drawing on Boud and Solomon (2001), WIL represents conceptual shifts in contemporary higher education practices and academic identities. Tynjala et al. (2003) identified that WIL embodies critical changes in university-society relationships that are re-designing academic work and creating new dynamics in knowledge production and in university pedagogy and educational practices. Following Boud and Solomon, academics engaged in WIL take on different subject positions compared to other academics because they are subjected to distinct forms of regulation in the university and in workplaces, and the special expertise and pedagogical approaches they need to draw on shape their identity in ways that differ to traditional disciplinary-based knowledge and practice (Billet, 2009; Britzman, 2003; Coll & Eames, 2004). In light of WIL being integral to the function of the Australian higher education system and a core activity forging new identities for many academics, it ought to be included in descriptions of what it is that lecturers do and valued as equally important to other day-to-day academic tasks.

Conclusion

WIL offers unique opportunities for universities, students, governments and employers and it appears it is here to stay as a distinctive feature of Australian higher education and an integral component of academic work. However, at the same time that the benefits of WIL are appreciated, WIL is typically missing from common accounts of lecturers' work. This article has identified that WIL is often sidelined within a hierarchy of academic activities and can be mistakenly conceptualized as akin to teaching on campus units.

Drawing on Spencer and McDonald (1998), there appears to be a dissonance between WIL being fundamental to a university education and a lack of recognition extended to it. This article argues that it is time for a creative reassessment of academic work roles and expecta-

tions in ways that recognize the distinctiveness and value of WIL. Including WIL within descriptions of what it is that academics do in ways that are comparable to research, on-campus teaching, community engagement, and university administration is long overdue and reasons for doing so were observed.

This paper does not specifically address the questions of whether and how academic staff should be involved with WIL. There is also a need for further research on whether the inclusion of WIL in descriptions of academic work roles would result in increased resources and organizational esteem for WIL as well as improved learning experiences and outcomes for students. The assertion that WIL results in work-ready graduates also deserves scrutiny.

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Comparative Curriculum Analysis of Mechanical Engineering Technology Programs at Purdue University and the National Taipei University of Technology

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Abstract

Career and technical education in tertiary education in the US or Taiwan is always linked to employment preparation in specific occupations or careers, which differs from traditional academic postsecondary education. Academic education at the tertiary education stage encompasses formal undergraduate programs designed to impart knowledge and skills. However, career education instruction typically involves more application and less theory than that taught in academic programs. Many manufacturing careers have transferred to Mainland China, causing the curriculum in a technological university in Taiwan to reform to the current situation. Comparing the curriculum for mechanical engineering technology between the USA and Taiwan may provide suggestions for reshaping the curriculum for employment preparation in specific occupations. The mechanical engineering curriculum for the department of National Taipei University of Technology differs from that of Purdue University in theory and applied courses because of more implementation of the cooperative activities in Purdue University. This analysis shows that Taiwan does not offer the fundamental courses of Physics and Calculus. Manufacturing processes are more important at Purdue University due to six credit courses within two semesters. NTUT offers fundamental theories in mechanical engineering such as Thermodynamics, Fluid Mechanics, and Strength of Materials, while Purdue University provides courses such as Heat Power, Fluid Power, and Applied Strength of Materials, projecting more application details. Oral communication and technical writing courses in the USA help students meet employment requirements. A curriculum comparison of mechanical engineering technology between the USA and Taiwan gives a reshaping approach to course arrangement in Taiwan.

Keywords: Comparative education, curriculum, mechanical engineering, educational objective.

Introduction

Radcliffe (2006) reports that the research priority for the new discipline of Engineering Education is to enhance engineering thinking, knowledge, and competencies of students' for facing the future. Previous enhanced items should connect to the curricula of each professional program (department). However, it is an important but difficult issue to understand the structure and coverage of tertiary education programs. Recent studies have increasingly emphasized monitoring the structure and coverage of tertiary education programs, and making the results more widely available (Gou et al., 2008). Baker (1983) compared the curricula according to curriculum characteristics including entrance requirements, accreditation, program length, instructional methods, scholastic standards, tuition costs, general education requirements, and technical course requirements. A previous comparison analysis to other colleges in various countries reveals that different countries have their own styles.

One way to achieve this analysis is to compare the curriculum for programs in mechanical engineering technology to a known standard. Many institutions monitor their own programs informally, and make little effort to enlighten outsiders (Kuo, 2006). Outsiders such as official agents and non-government organizations have placed increased emphasis on monitoring the structure and coverage of tertiary education programs. The Accreditation Board for Engineering and Technology (ABET) has recently become the recognized accreditor for university programs in applied science, computing, engineering, and technology (ABET, 2010).

Traditionally, baccalaureate Mechanical Engineering Technology (MET) courses have provided a broad skill set required for both entry-level success and long-term advancement. The core courses include topics such as thermodynamics, dynamics, fluid mechanics, and automation and control systems. The curriculum includes effective written, oral, and graphic communications along with computer literacy. This curriculum prepares students in MET for a range of technical positions including system design, fabrication, manufacturing, HVAC (heating, ventilating and air conditioning), and construction (Old Dominion, 2010a). Program graduates are prepared for professional careers as mechanical engineers, and for graduate study in mechanical engineering or related fields. Mechanical engineers design and manufacture systems that convert energy into useful work (Tsai & Wang, 2010). Using the laws of nature, along with mathematical analysis, communications, and computational skills, students are educated to develop creative solutions for societal needs. Virtually every industry and government agency seeks mechanical engineers, employed in areas specializing in design, research and development, manufacturing, production, management, project planning, consulting, testing, quality assurance, and technical sales (Old Dominion, 2010b). The above shows that the educational objective and core ability, as well as the professional career are different between the ME and MET departments. Each department course should therefore be different for the achieved abilities of students.

Table 1.

First year courses of MET in NTUT and Purdue University

First Year			
ME NTUT		MET Purdue U.	
Course	Credit	Course	Credit
Engineering Mathematics(I)	3	Precalculus	5
Engineering Mathematics(II)	3	Calculus for Technology I	3
Mechanical Drawing	1	Graphics Comm.	3
Computer Drawing	3		
Computational Program and Practice	2	Computational Analysis Tools in MET	1
Intermediate English and Practice (I)	1	English Composition	3
Intermediate English and Practice(II)	1		
		General Physics	4
Special Project (I)	2		
		Applied Statics	3
Manufacturing Processes	3	Manufacturing Processes I	3
Material Science and Engineering	3	Materials I	3
Practical Workshop Training	0		
Principles of Electrical Engineering and Experiments	3		
Automatic Control	3		
		Production Design and Specifications	3

However, in Taiwan, neither the engineering departments nor the engineering technology departments in the (Technological) universities follow the accredited program of the Engineering Accreditation Commission (EAC) of ABET. Neither the Department of Mechanical Engineering at National Taipei University of Technology (NTUT), nor the Engineering Department at the Technological University follows the Technology Accreditation Commission (TAC). This work thus reviews the undergraduate curriculums of the Mechanical Engineering Technology of NTUT and Purdue University, and then compares these two curriculums. Purdue University offers a two-year MET program for students enrolled from the community college and junior college. NTUT offers a MET program similar to Purdue University.

The accredited programs of ABET induce different student abilities; for example, in Purdue University, the MET having more internship education, and the quantity of the experimental courses under the Technology Accreditation Commission of ABET. The description would link this curriculum comparison study and the higher technological education. Since the MET of Purdue University provides consistently the practical training courses and the optional internship which give the average starting salary of 50k UND per year of graduated students. At the same time, the MET of the technological Universities in Taiwan provide the curriculums nearly insignificant variation respect to the ones of ME of Universities. Based on this comparison the authors hope to feedback the curriculum approach of MET in USA to be the reference for the MET curriculum reforming in the future in Taiwan. Hence, this paper describes the department's undergraduate curriculums and presents the results of curriculum comparison of these two universities. The accredited programs of ABET induce different student abilities for examples of the cooperative education between college and enterprise, and the quantity of the experimental courses. The current study is especially interested in comparing technology courses with a mechanical technician emphasis. Finally, this research discusses the findings and presents conclusions.

Engineering Technology Curriculum

The undergraduate program is a general mechanical engineering technology curriculum designed to allow students within NTUT and the Taiwan degree framework to develop the knowledge necessary to begin a career as a mechanical engineering professional, or to begin graduate study in mechanical engineering technology. Students may credit mechanical engineering technology courses to meet undergraduate degrees; however, those in mechanical engineering technology typically work toward a Baccalaureate of Science (B.S.) degree. Both degrees offered from the university and the Technological University are two-year degrees, the same as a B.S. At the time of this study, neither the major educational requirements of the department nor the core abilities of the students with a mechanical engineering (technology) major are different. Therefore, the program students specializing in mechanical engineering technology is constrained only by the general B.S. requirements. The regulations for the mechanical engineering technology major reflect the advice given to B.S. students specializing in mechanical engineering technology. Consequently, this study applies to the current situation, and structures the curriculum into courses for a two-year degree. Previous published curricula, courses taught elsewhere, and staff expertise influence the course design.

Table 2.

Second year courses of MET in NTUT and Purdue University

Second Year			
ME NTUT		MET Purdue U.	
Course	Credit	Course	Credit
Dynamics	3	Dynamics	3
Strength of Materials	3	Applied Strength of Materials	4
Intermediate Mechanics of Materials	3		
Practical English	1	Fundamentals of Speech Communication	3
Thermodynamics	3	Heat/Power	3
Fluid Mechanics	3	Fluid Power	3
Special Project (II)	2		
Engineering Mathematics(II)	3		
Engineering Materials	3		
Mechanical Design	3	Machine Elements I	3
Mechanical Engineering Experiments	1		
		Manufacturing Processes II	3
		Elect. Light(Physics)	4
		Electricity Fund.	3

Students must accomplish 72 credits to meet the graduation requirement of MET in NTUT (Tsai & Wang, 2010)and in Purdue University Purdue University, 2010). Table 1 shows that the courses on "Mathematics or Calculus," "<Manufacturing," "Materials," "Mechanics," "Drawing," and "English" are the general service course and essential to the main undergraduate program. "Automatic Control" and "Special Project" are two courses in the first year in NTUT. Purdue University offers a different course, "Production Design and Specifications," compared to NTUT. Zero-credit courses are compulsory subjects in NTUT, particularly in Taiwan. Students in NTUT are the frontier in Taiwan, so NTUT provides six credits of Engineering Mathematics. Research has demonstrated that the quality and level of students are not dependent on their majors, but upon the whole system and course

content, knowledge, quality, and capacity of the university. Thus, the configuration of the course system in the teaching curriculum is very important as the course system reflects the professional training goal.

In Table 2, the course on "Intermediate Mechanics of Materials" is the same course as that offered to frontier students enrolled in NTUT, a general service course not considered part of the main undergraduate program. The most important and difficult point is course continuity. In many cases, students are required to obtain a quantity of information and knowledge, but ignore the level and continuity of the courses, leading to disconnected courses and an unfulfilled training goal.

Table 3.

Whole courses of MET in NTUT and Purdue University

ME NTUT		MET Purdue U.	
Course	**Credit**	**Course**	**Credit**
Intermediate English and Practice (I)	1	English Composition	3
Intermediate English and Practice (II)	1	Fundamentals of Speech Communication	3
Practical English	1		
Engineering Mathematics(I)	3	Precalculus	5
Engineering Mathematics(II)	3	Calculus for Technology I	3
Computational Program and Practice	2	Computational Analysis Tools in MET	1
		General Physics	4
		Elect. Light(Physics)	4
Mechanical Drawing	1	Graphics Comm.	3
Computer Drawing	3		
	2	Applied Statics	3
Dynamics	3	Dynamics	3
Material Science and Engineering	3	Materials I	3
Strength of Materials	3	Applied Strength of Materials	4
Intermediate Mechanics of Materials	3		
Thermodynamics	3	Heat Power	3
Fluid Mechanics	3	Fluid Power	3
Principles of Electrical Engineering and Experiments	3	Electricity Fund.	3
Mechanical Design	3	Machine Elements I	3
Automatic Control	3		
Mechanical Engineering Experiments	1		
		Production Design and Specifications	3
Manufacturing Procrsses	3	Manufacturing Processes I	3
		Manufacturing Processes II	3

Comparison Results

This study estimates the number of knowledge units covered by a course to compare curriculums, primarily the number of lecture hours. Table 3 shows the actual listing of the comparison results by the spreadsheet. Each cell in the table is the knowledge unit in the course, such as Mechanics. The number of lecture hours identifies the "credits of each course. The eight-credit Physics course at Purdue University is a fundamental one, not offered at NTUT. Manufacturing Processes is more important at Purdue University due to the six credit courses within two semesters. Fundamental theory courses at NTUT include Thermodynamics, Fluid Mechanics, and Strength of Materials, while Purdue University offers Heat Power, Fluid Power, and Applied Strength of Materials. These courses project more application details.

Students can arrange or augment these courses to suit the requirements of many different degree programs. Knowledge units can even split across courses. The current report describes each knowledge unit together with the minimum amount of lecture time necessary for the pre-requisite knowledge units. This method is reasonable and explicitly allowed in this analysis because of the broad agreement between the MET program at NTUT and Purdue University. Finally, in the Architecture subject area there are a few knowledge units with hours. However, at Purdue University the MET provides several courses involving Fundamentals of Speech Communication and Mechanical Drawing, as well as Production Design and Specifications, indicating that oral and graphic communications are important for a mechanical technician. Furthermore, Calculus at Purdue University is essential for technician training instead of Engineering Mathematics.

The importance Purdue University attaches to its requirements for baccalaureate degrees reduces this difference to a certain extent. Such requirements are less typical in Taiwan, particularly because there are no such requirements in ABET. The courses to achieve core abilities of students depend on the curriculum committee of each department. The ABET identities the established procedure without proof of its effectiveness. This might suggest that the MET curriculum could possibly abandon some of the advanced material in favor of greater emphasis on more basic units. However, the technological university in Taiwan should make sure that it sufficiently covers the basics so that students will benefit from more advanced courses, since so many graduating students directly leave the technological university to begin careers as associate engineers, not as technicians. The curriculum committee must structure the program to support that transition.

A weakness in Taiwan recently detected in the NTUT program is insufficient emphasis on engineering software application. The design process in several courses in the MET program does not provide enough opportunity for students to acquire necessary skills in this area. A similar problem exists with user-interface design and software reuse--both issues that are of great importance to modern software development.

Conclusion

Traditional baccalaureate Mechanical Engineering Technology (MET) courses provide a broad skill set required for both entry-level success and long-term advancement. This analysis of the two-year MET programs between NTUT and Purdue University concludes that “Automatic Control” and “Special Project” are two courses in the first year, particularly in NTUT. In Purdue University, “Product Design and Specifications” is a different course compared to NTUT. Zero-credit courses are compulsory subjects in NTUT, particularly in Taiwan. Students in NTUT are the frontier in Taiwan, so NTUT provides Engineering Mathematics of six credits. However, the design process in several courses of the MET program does not provide enough opportunity for students to acquire necessary skills in the software application package. Furthermore, the ABET identifies the procedure of students’ core abilities established in the curriculum. However, it does not prove the effectiveness of the curriculum. The technological university in Taiwan should make sure that it covers

the basics sufficiently well so that students will benefit from more advanced courses, since so many graduating students directly leave the technological university to begin careers as associate engineer, not as technicians. The curriculum committee must structure the program to support that transition.

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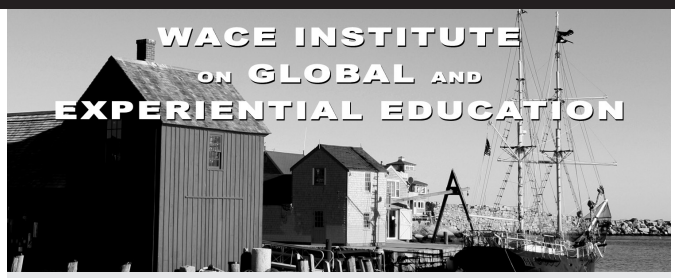

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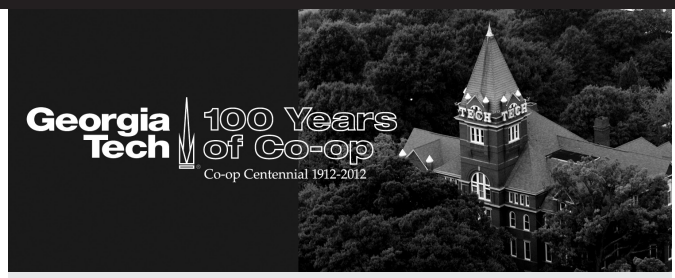

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Mentoring Latinos in STEM: Transforming Struggling Co-op Students into Savvy Professionals

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Abstract

Mentoring, a proven strategy for student retention and graduation, involves new and complex challenges as mentors and students work together across diverse cultures. Amid competing agendas and pressures, one highly sought-after group — Latino students in the science, technology, engineering, and math (STEM) disciplines — may be vulnerable to dropping out because they lack the traditional support systems of their peers. Today, the question of how to mentor Latino students takes on greater urgency as they are the fastest-growing minority population in the U.S., yet continue to report the lowest percentage of educational attainment than any other ethnic minority groups (U.S. Census Bureau, 2007). In this article, we explore perceived barriers to career development for Latino students and make recommendations for co-op practitioners in hopes of attracting and retaining the diverse group of STEM professionals needed for the 21st century.

Keywords: Mentoring, Latinos, co-op, STEM, training.

Introduction

> *As a Latina in the sciences, Aida had already beaten the odds. Not only had she gained admission to a prestigious university in the South, she was enrolled in a rigorous undergraduate engineering curriculum and participating in a competitive cooperative education placement. Despite her academic achievement in the classroom, Aida's negative experiences in cooperative education (co-op), including dismissive co-workers, lack of guidance and support by her supervisor, and occasional requests for non work-related Spanish translations, were driving her away from a career in the STEM fields* (Science, Technology, Engineering, and Math). *Compounding this situation were Aida's ingrained cultural values that inhibited her from playing a more active role in seeking help from others. While unfortunate for the individual, this scenario has potentially serious consequences for the future scientific and technological communities in the United States* (National Academies Press, 2007). *The loss of even one qualified Latino voice in the STEM fields represents a unique cultural perspective that will never be heard, a risk that this nation cannot afford* (Taningco, Mathew, & Pachon, 2008).

This true case study, from a research-intensive university in 2006, shows that challenges of Latino students in the sciences persist despite minor gains in recruiting minority students to the STEM disciplines. In fact, the dearth of minorities in STEM is part of a larger problem in which experts recognize the overall percentage of domestic students pursuing degrees in science and technology as far lower than that of their peers in developed and developing nations around the world. A recent report identified the rate of completion for degrees in natural sciences and engineering as 15% for U.S. undergraduate students as compared with completion rates by students in South Korea, 38%, France, 47%, China, 50%, and Singapore, 67%, during this same time period (National Science Board, 2004). Further, as advanced training in natural sciences and engineering has become more widespread, the U.S. continues to lose its competitive advantage of innovation in the fields of science and technology (National Science Board, 2008). This looming crisis would suggest a renewed imperative for colleges and universities to increase efforts in retaining students who express interest in the STEM fields (National Science Foundation, 2007).

We contend that positive interactions with supervisors and mentors in co-op may be a critical turning point for Latino students in their decision to persist and advance in their chosen career path.

One strategy to address current deficits is for colleges and universities to provide STEM preparation programs designed to meet the specific needs of underrepresented student populations (Fifolt & Abbott, 2008). STEM preparation programs, like co-op, have been cited in the literature as a source of support for Latino students to identify with someone who has shared similar experiences and has succeeded at the highest levels in their professions (Burger et al., 2007; Frehill, Ketcham, & Jeser-Cannavale, 2005; Handelsman et al., 2005; Jackson, 2007; Packard, 2005; Suarez, 2003).

For the purposes of this article, co-op is defined as an educational strategy that combines academic training with practical work experience (Kerka, 1999). Previous research has suggested that co-op placements can provide students with a transformative learning environment through engagement with others (Fifolt & Abbott, 2008; Kerka, 1999; Mezirow, 1991). We contend that positive interactions with supervisors and mentors in co-op may be a critical turning point for Latino students in their decision to persist and advance in their chosen career path.

Background

In 2005, the National Academies Press released a landmark report regarding the state of science and technology in the U.S. The authoring committee of *Rising Above the Gathering Storm* identified priorities for the U. S. to remain competitive in the 21st century. One of its recommendations was to increase the number and proportion of U. S. citizens earning a bachelor's degree in natural sciences and engineering by providing 25,000 new 4-year competitive undergraduate scholarships each year to U.S. citizens attending U.S. institutions. The committee's rationale was that the U.S. was simply not producing enough graduates in the STEM fields to meet the growing demands of an increasingly competitive

global economy. Extending their storm-warning analogy, the committee recently ratified their previous recommendations in the aptly named follow-up publication entitled: *Rising Above the Gathering Storm: Rapidly Approaching Category 5* (National Academies Press, 2010).

Meanwhile, the demographics of the general student population in the U.S. continue to shift with the National Science Foundation (NSF) anticipating several parallel changes in the profile of students pursuing careers in the STEM fields (NSF, 2007). First, overall, Latinos are the largest and fastest-growing population in the United States (U.S. Census, 2009). In 2005, Latinos accounted for 14.5% of the total U.S. population. By the middle of this century, it is estimated that they will constitute 25% of the total population (Taningco et al., 2008).

Second, minorities are expected to comprise more than half (52%) of the resident college-age population of the United States by 2050 (U.S. Census, 2009). Despite rapid Latino growth rates, however, it is unclear how many of these college-bound students will be Latinos. In fact, Latinos consistently report the lowest percentage of educational attainment of any ethnic minority group. Only 13% of Latinos in the United States have completed a baccalaureate degree and only 4% have attained an advanced degree (U.S. Census Bureau, 2009). In academic year 2004-05, Latino STEM graduates accounted for 8% of all graduates at the bachelor's level, 4% at the master's level, and 3% at the doctoral level (National Science Board, 2008). While the number of Latinos employed in nonacademic Science and Engineering occupations has grown over time, the proportion of individuals in these fields, 5% in 2005, is still far less than the proportion of the overall Latino population (National Science Board, 2008). These indicators clearly suggest a unique opportunity for Latinos to engage in STEM fields at far greater levels at the post-secondary level and beyond.

Challenges to Access and Retention

At the same time leaders are calling for increased participation by Latinos in STEM fields, researchers have identified several challenges with regards to recruiting and retaining students from this population. Contributing to such challenges are issues encountered in elementary and secondary education, including (a) student behavior characteristics (e.g., low self confidence, poor academic preparation), (b) family characteristics (e.g., socio-economic status, parental involvement, cultural values), and (c) institutional factors (e.g., levels of instruction, learning opportunities, educational technology) (Taningco et al., 2008). Further exacerbating these issues are challenges encountered at the postsecondary level, such as being recruited into demanding STEM curricula and provided insufficient guidance and support (Taningco et al., 2008; Tornatzky, Macias, Jenkins, & Solis, 2006).

The lack of an appropriate support system may be especially detrimental for underrepresented minorities who (a) place primary value on people and groups over grades and status (Seymour & Hewitt, 1997), (b) lack familial and societal role models (Gardella, Candales, & Ricardo-Rivera, 2004), and (c) forsake demanding STEM-related courses in

order to attend to more immediate financial conditions and family obligations (Seymour & Hewitt, 1997). It has been noted that while enrollment in STEM curricula may increase for women and minorities due to strong recruitment programs, issues of retention and completion rates have yet to be adequately addressed at the institutional level (Friedman & Kay, 1990). Advocates for policy and program reform demand that attention be paid not only to the input end of the pipeline but also to the leaks along the way (Burger et al., 2007). The goal of this article is to demonstrate how mentoring in co-op programs can become part of the solution.

Perceived Barriers to Career Development

Research shows Latino students report specific barriers to their success in academic and pre-professional settings, including feelings of alienation, isolation, and confusion about their roles in the organization (Bordes & Arrendondo, 2005). Researchers have described unreceptive work environments and hierarchical structures as major deterrents to underrepresented populations considering careers in the STEM fields (Creamer & Laughlin, 2005; Creamer, Burger, & Meszaros, 2004; Ricks & Van Gyn, 1997). Further, multiple studies have indicated that early departure from STEM fields by underrepresented minorities was based primarily on alternative choices rather than poor academic performance (Burger, et al., 2007; Creamer & Laughlin, 2005; Creamer et al., 2004; NSF, 1999; Seymour & Hewitt, 1997).

Research literature has shown that Latino students who perceive barriers to career success have altered their career pursuits (Leal-Muniz & Constantine, 2005), and that the greater the perceived barriers by Latinas the more likely they were to select female-dominated professions which they deemed as more manageable (Rivera, Chen, Flores, Blumberg, & Ponterotto, 2007). In Social Cognitive Career theory (Bandura, 1986; Lent, Brown, & Hackett, 1994), career development is viewed as a system that incorporates cognitive processes and environmental and contextual factors. According to experts, the contextual variables of perceived barriers, acculturation, and role models can have both a direct and indirect influence on self-efficacy (Byars-Winston, Estrada, Howard, Davis, & Zalapa, 2010; Flores, Navarro, & Ojeda, 2006; Lent et al., 1994).

Acculturation: Dissonance, not congruity. Researchers have found that acculturation influences the work experience and career development of racial and ethnic minorities (Flores, 2009; Patel, Salahuddin, & O'Brien, 2008; Rivera et al., 2007). According to Berry (2003), acculturation is a multidimensional psychosocial process that occurs when two or more cultures come into contact with one another. As a result, individuals from each group learn the cultural values and practices of a new culture while maintaining some degree of cultural affiliation to their traditional culture. Variables such as career decision-making, self-efficacy, job satisfaction, and employment skepticism are influenced by acculturation.

Research has shown that the lack of *cultural congruity* may be a significant factor related to academic persistence by Latino students (Cole & Espinoza, 2008; Constantine, Robinson, Wilton, & Caldwell, 2002; Gloria, 1993). According to Bordes and Arrendondo (2005):

> Latina/o college students' identity statuses may enable them to feel a sense of belonging or disconnect from their cultural group and the university mainstream. For example, their sense of identity diffusion and/or negative identity may be a hindrance to their sense of belonging and comfort (p. 116).

While the issues of access and support for underrepresented populations in the STEM fields cannot be addressed single-handedly, research has shown mentoring to be a strategy that can help Latino students achieve success in the STEM fields.

Miller (2004) identified interdisciplinary theories to help reconcile students' varied experiences in cross-cultural co-op placements. The author determined that experiential education activities, like co-op, could help students explore the complex and frequently overlapping identities that exist in the workplace. Further, Fouad (2001) suggested that employers who demonstrate an awareness of the multiple identities that individuals bring to the workplace and appreciate these unique cultural perspectives can minimize the sense of cultural dissonance that Latinos may feel between their work life and home life.

Self-efficacy: The need for role models. Role models are cited in the literature as a critical source of vicarious learning through which behaviors are learned and efficacy beliefs are formed (Bandura, 1986). Role models may also influence protégés by verbally encouraging them to engage in certain types of behavior. Research has shown that role models are significant in the educational and career pursuits of Latinos (Flores, Obasi & Ezemenari, 2005), and may have a direct influence on self-efficacy beliefs among individuals in science, engineering, and math (Hackett, Esposito, & O'Halloran, 1989; Nauta, Epperson, & Kahn, 1998). In the absence of culturally competent role models, however, research has also suggested that underrepresented students will continue to exist on the margins of the STEM professions (Aguirre, 2009; Bordes, & Arredondo, 2005; Laden, 2000).

Theory-to-Practice

While the issues of access and support for underrepresented populations in the STEM fields cannot be addressed single-handedly, research has shown mentoring to be a strategy that can help Latino students achieve success in the STEM fields (Freehill, Ketcham, & Jeser-Cannavale, 2004; Jackson, 2007; Taningco, 2008; Tornatzy et al., 2006). In practice, however, owing to the lack of Latinos participating in the STEM fields overall, mentors often come from different cultural and ethnic backgrounds. Assuming mentors enter into the relationship with the best of intentions, a gap may still exist with regard to how deeply mentors understand the lived experiences of their Latino protégés (Freehill et al., 2004; Jackson, 2007; Taningco, 2008; Tornatzy, Marcias, Jenkins, & Solis, 2006). By the same standard, if students also lack experience working with a mentor from another culture, they may find seeing eye-to-eye especially difficult.

For example, recent research on mentoring and talent development suggests that *relationally-savvy* protégés are (a) highly proactive in seeking out others' counsel, (b) manage interactions with *developers* with care, (c) hold attitudes conducive to reaching out to others for learning, and (d) have outstanding social skills (Chandler, Hall, & Kram, 2010). Research by Taningco et al. (2008), however, has demonstrated that *effective mentoring behaviors* are culturally-bound constructs which may be unfamiliar or even counterintuitive to the traditional values and norms of the Latino community.

Mentoring Across Cultures

Faculty and other professionals need to be prepared for potential issues that can arise as a result of cross-cultural mentoring relationships. They may see that students possess cultural mistrust (Johnson, 2007), based on personal history and experiences of racism or mistreatment by the majority race or a reluctance to establish a relationship with the cross-cultural mentor for fear of having the appearance of betraying one's own cultural group. Mentors may find students who feel inhibited based on hierarchical power structures, both real and perceived, and who are less willing to participate fully in the mentoring relationship based on concerns of cultural stereotyping by the mentor. Finally, the mentor may also possess cultural mistrust, negative cultural biases, and fears about being successful in relating to someone from another culture based on a negative experience or a lack of experience with a culture that is different from his or her own.

The increasing workforce diversity, however, demands that businesses and organizations identify ways to support and foster relationships among people from different cultures, backgrounds, and perspectives. According to Blake-Beard, Murrell, and Thomas (2007), "The impact of race on mentoring relationships is an important question to raise, first and foremost because the changing composition of the workforce means that individuals will experience more cross-race (and cross-cultural) interactions within organizations of today and tomorrow" (p. 225).

Mentor Preparation

For mentors, considering the context of the protégé is a requisite part of the preparation to mentor someone of another culture. According to Zachary (2000):

> Having an authentic desire to learn about another culture requires an openness and willingness to listen without making value judgments about what is being heard. Mentors must genuinely want to understand how culture affects the unique individuals engaged in the mentoring relationship (p. 47).

Thomas (2001) suggested that individuals who are mentoring across races or cultures can foster success among their protégés by implementing the following strategies: (a) create challenging assignments, (b) put them in high-trust positions — thus communicating that they are high performers, (c) provide crucial career advice, (d) sponsor and recruit them into new positions, and (e) protect them by confronting critics, particularly when criticism includes racial undertones. Despite the potential challenges of cross-cultural mentoring, researchers have posited that cross-cultural mentorships can be as helpful and satisfying as same-culture mentorships once they have been established (Johnson, 2007; Schlosser, Lyons, Talleyrand, Kim, & Johnson, 2006).

Overcoming Barriers

In a review of student outcomes literature associated with participation in co-op, Fletcher (1990) noted that self-esteem was a "major growth benefit experienced by participants" (p. 41). Specifically, the author identified competency as one dimension of self-esteem that was positively affected by participation in cooperative education. According to the author, "one way to enhance an individual's sense of competence is through providing conditions in which successful task-mastery can be objectively achieved and subjectively internalized" (p. 43). Fletcher's (1990) work suggested that participation in co-op can enhance self-efficacy by (a) encouraging person-job congruence, (b) promoting formative and summative evaluations, and (c) providing opportunities for individuals to set and accept challenging goals. Given the specific concerns expressed by underrepresented populations in the STEM fields, mentoring in cooperative education may be a key element in maximizing the various elements of self-efficacy.

We propose that interactions between co-op students and supervisors could be greatly enhanced through training on the basics of mentoring. Not only would such training benefit student retention and completion rates, it would also boost mentor and students' cultural competence, a critical workplace skill in the 21st century.

Recommendations for Practitioners

We propose that interactions between co-op students and supervisors could be greatly enhanced through training on the basics of mentoring. Not only would such training benefit student retention and completion rates, it would also boost mentor and students' *cultural competence*, a critical workplace skill in the 21st century (Houghton & Proscio, 2001). According to Johnson (2007), cross-cultural training can provide mentors and protégés with the skills necessary to see each other as individuals, unique and complex, and to rely on individual interactions rather than cultural stereotypes in formulating perceptions of one another.

Mentor-Protégé Training

Training for supervisors and other co-op mentors may play a key role in preparing individuals to work with an increasingly diverse workforce. According to Zachary (2000),

mentor preparation is about increasing an individual's level of readiness to assume the responsibilities of a mentor. Prior to a cross-cultural mentoring experience, the author recommends that individuals complete the *Cross-Cultural Mentoring Skills Inventory* to assess their level of comfort with a range of skills and dispositions related to cultural understanding (Zachary, 2000). Mentors may also find it useful to review the practical mentoring guidelines proposed by Zalaquett and Lopez (2006) based on their investigation of 13 academically successful Latino undergraduate students.

Cross-cultural competence. According to Flores (2009), a pre-requisite to being culturally sensitive is valuing and affirming diversity and differences. This involves understanding the worldview of another culture, the acculturation process, and racial and ethnic *identity* development in individual members of cultural groups. Kwan and Taub (2003) suggested that professionals can demonstrate cultural competence by (a) having knowledge of the demographic background and culture of the students, (b) developing an understanding of their own impact on ethnic/racial minorities' feelings of being different, and (c) integrating that knowledge into the mentoring process.

Zachary (2000) suggested that mentors pay close attention to communication cues in order to better understand culturally-specific words, phrases, and expressions. For further expanding one's cultural competence, we recommend *Kiss, Bow, and Shake Hands* (Morrison, Conaway, & Borden, 1994), which describes the customs, business practices, cognitive styles, protocols, greetings, and behaviors for 60 different countries.

Protégés can also benefit from cross-cultural training to raise their level of competence in the following areas: (a) communicating with others, (b) setting realistic expectations, (c) conducting an accurate self-appraisal, and (d) negotiating the social norms of the organization (Zachary, 2000). Not only can these skills help students work better with their mentors but also with other faculty and peers in an increasingly diverse workplace (Eyler & Giles, 1999). Zachary (2000) suggested that protégés be clear about their learning goals and ask their mentors if they might discuss mutual expectations about each other's roles and responsibilities.

Multiple mentors. Within situated learning theory, Lave and Wenger (1991) identified *participation* as a key element to learning within a social context. The researchers advocated for *newcomers* (protégés) to network with *old timers* (multiple mentors) in order to better understand the technical and nontechnical aspects associated with a specific *community of practice.* Co-op supervisors can assist Latino students by helping them identify individuals inside and outside of their organization who can assist them in meeting their various learning goals. Higgins and Kram (2001) spoke of a developmental network as "the set of people a protégé names as taking an active interest in and action to advance the protégé's career by providing developmental assistance" (p. 268). Johnson (2007) suggested that the most successful people are those who "rely on multiple individuals for developmental support during their careers" (p. 31).

As stated by Johnson and Ridley (2004), "People who have multiple sources of mentoring are more productive, successful, and content with their careers than those who have a single mentor" (p. 94). Underlying this common view is the assumption that a single mentor cannot and should not meet every protégé's developmental needs. This is a common mistake among new protégés, which illustrates how networking and building a support system can be essential survival skills for Latino students to learn early in their careers.

Reflection. Supervisors and coordinators can support Latino students in co-op by promoting reflection as a best practice for professional development. Reflection has long been recognized as a critical element in experiential learning activities (Dewey, 1897; Kolb, 1984; NSEE, 1997; Piaget, 1954). Researchers have asserted that it is not enough for a student to simply pass through an activity (e.g., cooperative education) without actively reflecting on what he or she has learned. In order for an experience to have true meaning, the student must process the experience. Reflection is the *filter* through which students can make relevant conceptual connections between what they are trying to learn and what they have already learned or experienced (Bruner, 1961; Flavell, 1985). For reflection to be most effective, Qualters (2011) has suggested that it be delivered as part of a reflective curriculum rather than experienced as isolated incidents. Current literature also identifies peer-to-peer interactions as a potential source for mentoring and reflection in cooperative education (Bundy, Paul, & Newborg, 2010; Colvin & Ashman, 2010; Waters & Gilstrap, 2010).

Conclusions and Next Steps

While little has been written about mentoring Latino students in cooperative education, there has been a growing awareness and response in the research literature to the unique needs of this emergent population. We would encourage potential mentors to tap into this rich pool of resources. For individuals who are interested in further examining the experiences of Latino students participating in cooperative education, we would propose the following set of questions:

1. In what ways might cultural background influence a Latino students' understanding of career development and/or shape the co-op experience?
2. What is a co-op employer's obligation to respect and respond to cultural differences or misperceptions?
3. How might employers address the intra and interpersonal skills necessary to perform the nontechnical aspects of work in ways that are consistent with competing cultural norms?
4. To what extent should co-op programs intentionally prepare supervisors and students with the skills that characterize effective mentoring relationships, including cross-cultural competence?
5. How might theoretical perspectives of experiential education and other disciplines be used to help frame students' experiences in cooperative education in light of the growing body of literature on underrepresented populations, specifically Latino students, in the STEM disciplines? (Linn, 2004; Miller, 2004).

Aida's situation is probably not an isolated case, but working together as mentors and protégés we should be able to ensure that students like her persist in the STEM fields in the future. As the data have shown, the changing demographics in the population points to:

> . . . a dramatic and profound need for career assistance for racial and ethnic minorities and persons from lower social classes as they more fully move and integrate into the schools and workplaces that have so long discriminated against and marginalized them (Flores, 2009, p. 57).

Ideally, co-op programs can serve as this transitional bridge from school to work for Latino students entering the STEM professions. However, these programs will succeed only if their students succeed and this can only happen through the concerted efforts of culturally competent mentors and protégés who see the benefits of removing barriers to attract and retain the best Latino minds of the 21st century.

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Developing an Online Learning Community for Engineering, Cooperative-Education Students: A Design-Based Research Study

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Abstract

Cooperative education is a learning model that integrates theory and practice by having students alternate work and school terms. Limited research has been done to assess or enhance learning through cooperative education. Technical engagement of students at work might be one method to enhance learning. The purpose of this study was to create a theory-informed design of an online learning community for engineering cooperative-education students and to refine the underlying learning theories on which the design was based. A design for an online community was developed and is ready to be assessed for its affect on student learning through work.

Keywords: Work-integrated learning, technology, community, reflection.

Work-integrated learning is an important educational model that has been utilized for many years. Apprenticeships, internships, practica, and cooperative education are common models of work-integrated learning. These models typically require students to participate in full-time, career-related work experiences for one or more terms as part of their formal education. The experience gained is valuable to the students' education, but as Dewey (1938) noted, experience alone is not an education. The problem with many work-integrated learning programs is that the work experience is an autonomous entity that is not thoughtfully integrated into the students' overall education (Marsh & Triseliotis, 1996). Many studies have found that students feel isolated, disengaged, and disconnected from their peers or their institution (Casey, Bloom, & Moan, 1994; Cohen, 2000; Mayer, 2002, Scherff & Paulus, 2006; Schlagal, Trathen, & Blanton, 1996). Even as its own entity, the work component is not fully realized as a learning mechanism. Eames (2000) noted that

the inability to place cooperative education on a sound educational basis has prevented the recognition of work-experience components as learning opportunities. Johnston, Angerelli, and Gajdamaschko (2004) believe that the field of experiential education risks becoming "nothing more than a job placement mechanism with limited intentional and mediated educational value — nonessential to the goals and objectives of the institution in which we reside" (p. 158) if it continues to ignore the pedagogical aspects of work-integrated learning. This begs the question of how educators can enhance the value of work-integrated learning.

One possible method to enhance student learning through work is through technical engagement by developing an online community. Current technology makes student engagement a viable task whether students are working locally or remotely. Many technologies are available to engage students in a variety of ways. Three studies found that technical engagement showed some student-perceived effect on practical knowledge (Canale & Duwart, 1999; Witmer, 1998) or perceived learning through collaboration and reflection (Canale & Duwart, 1999; Hayward, DiMarco, Kranz & Evans, 2001; Witmer, 1998).

A closer examination of literature about technical engagement of students at work revealed several gaps. For example, although different types of technology, such as e-mail, discussion boards, blogs, course management systems, and virtual communities were examined (e.g., Hatton & Smith, 1995; Paulus & Scherff, 2008; Roberts-DeGennaro, Brown, Min, & Siegel, 2005), none of these studies used an informed-design process to develop or enhance the use of the technology. The majority of the studies only considered one technology (e.g. email, discussion board, blog) and not an environment that incorporated multiple technologies. The research was not grounded in a theoretical framework. The research samples tended to be female-dominated, non-technical majors (e.g., Goos & Bennison, 2004, 2005; Hough, Smithey, & Evertson, 2004; Keegan, 2007). Only one study by Canale and Duwart (1999) was completed with engineering and computer science students.

Purpose and Research Questions

Based on the gaps in the literature, the purpose of this study was to create a theory-informed design of an online learning community for engineering, cooperative-education students, and to refine the underlying learning theories on which the design was based. The research questions posed were:

1. How can students', employers', faculty, and field experts' prior knowledge and experience be considered in the online community design?
2. How can students', employers', faculty, and field experts' design ideas and experiences using the online community influence the design of the community and the underlying community design theories?

Theoretical Framework

The theoretical framework used to develop and assess the online learning community was the model for community-based online learning developed by Palloff and Pratt (2007). The community-based online learning model brings elements from communities of practice theory (Lave & Wenger, 1991) together with elements specific to virtual communities with an emphasis on social collaboration and reflection. The development of community and social presence in a distance-learning course is the key to successful delivery of an online course (Picciano, 2002). Preece (2000) indicated that purpose, policies, and computer systems are needed to develop an online community. Building on this model, Palloff and Pratt (2003) believe that additional elements are needed to form an online *learning* community. The model has evolved over the years and currently includes the elements of people, purpose, and process with the outcome of reflective/transformative learning.

People. Social presence and interaction/communication are key factors (Palloff & Pratt, 2007). Social presence is the degree to which a person is considered "real" based on their behavior online (Polhemus, Shih, & Swan, 2000). The degree of social presence positively correlates to the degree of social interaction among participants (Stein & Wanstreet, 2003). Social presence supported by social interaction also reduces the possibility of learner isolation (Palloff & Pratt, 2007).

Purpose. The purpose element encompasses the ideas that an online community must have goals/purpose, and include the framework that allows students to focus on the purpose. This framework encompasses the practical considerations of the design and delivery of the online community, such as the amount of time students are involved, the sense of safety and security, and the rules and guidelines that govern their behavior.

Process. The process category includes the elements that drive reflective/transformative learning and social/constructivist learning (Palloff & Pratt, 2007). For example, an online community for learning must include features to promote social interaction and collaboration to support knowledge construction. In addition, reflection is needed to help students recognize learning or development needs. Reflection may lead to transformative learning, which is the interpretation of experiences, ideas, and assumptions gained through prior learning (Mezirow, 1990).

Method

Methodological framework. A design-based research methodology was used to create an informed design for the online community. This methodology stems from the works of Brown (1992) and Collins (1992). According to the Design-based Research Collaborative (2003), design-based research should take place in an authentic setting, result in the development and refinement of a learning environment, and lead to sharable theoretical frameworks and practices for instructional design.

Research design. Over a 9-month period, participants engaged in an iterative development-and-evaluation process of an online learning community for engineering, cooperative-education students. Throughout the cycles, the researchers examined how the development of this community for this unique educational setting (i.e., work-integrated learning) and its learner needs may affect the underlying theoretical model of community-based online learning.

Sample. The convenience sample was comprised of engineering students, departmental, and co-op faculty at a large urban Midwestern research university, employers who oversee an engineering cooperative-education program or supervise engineering students at their company, and field experts (faculty and staff from different colleges and universities who advise co-op and internship students across a variety of majors) (see Table 1). Ninety-three participants were recruited for Cycle 1, 52 were retained for Cycle 2.

Table 1. *Sample – Cycle 1 and Cycle 2*

Sample	Cycle 1	Cycle 2
Students	30	16
Faculty	14	9
Employers	39	20
Field Experts	10	7
Total	93	52

Data sources. The two main data sources were focus groups and surveys. For Cycle 1, focus groups were used only for faculty and field experts. Students, employers and a few faculty members completed a survey in lieu of participating in a focus group. The survey was posted online. The focus groups and the survey used the same questions with slight grammatical variations to better suit a survey format or a focus group (see Appendix A). For the Cycle 2, all participants answered an online survey (see Appendix B).

Procedure. For Cycle 1, all field experts participated in an hour-long focus group during a national co-op and internship conference. Most faculty members participated in an hour-long focus group in a university conference room. Students, employers, and additional faculty members completed an online survey. For Cycle 2, the first step was to build a prototype online community. Next the participants logged into the online community with a visitor account, reviewed and tested the prototype community, and completed a survey about its design and objectives.

Analysis. For Cycle 1, the focus group discussions were transcribed and compiled with the survey data. For Cycle 2, the survey data were downloaded and compiled. Content analysis was used to analyze the written and oral-communication data (Fraenkel & Wallen, 2003). This process involved determining coding categories based on the theoretical framework, categorizing the data, and using both frequency counts and themes to organize and synthesize the data.

All responses were assigned an alphanumeric identifier that indicated the participant status (e.g., faculty, student, field expert or employer) and gender. All comments were compiled into the theoretical model categories of people, purpose, and process (see Table 2 and Table 3). Two additional categories were created: "other relevant" and "other irrelevant" (see Table 2 and Table 3). Comments in each category were sorted into reoccurring themes.

Findings cycle 1. Cycle 1 addressed the first research questions of how students', employers', faculty, and field experts' prior knowledge and experience could be considered in the online community design. Table 2 shows the results of this analysis.

Table 2. *Cycle 1 Focus Group: Rank Order and Number of Comments for Each Model Category*

Category of Comments	Number of Comments	Rank
	Total	Total
Process	442	1
Purpose	321	2
People	297	3
Other Relevant	53	4
Other Irrelevant	107	
Total	1220	

Process. The greatest number of comments from participants was in the area of process. Participants suggested design ideas to enhance or incorporate professional collaboration and reflection in the online community such as synchronous and asynchronous discussions, event posting, internal messaging, e-mentoring, creating shared knowledge such as a wiki or a file share, networking or developing networks, and group projects and more social features such as posting birthdays.

Purpose. Surprisingly, only a few participants, primarily faculty, indicated the importance of having a purpose, value, or goal for the community to get students interested. For example, one faculty member noted "if those courses do not provide some kind of values to students back here on campus then there would not be much interest on the part of students in doing it."

The largest category of comments in purpose was the practical considerations for the design of the community. Participants noted privacy/security and the ability to customize these, time needed or allotted for participation, including when during the day community access should be granted (since students are at work), the issue of spam or unwanted contact or content, and the need for the community to be easy to use. For example, a female employer noted, "It would be nice to have a reminder on the site that students should not access it during work hours."

The last category of comments was about the protection of employer intellectual property and student information as related to the Family Educational Rights and Privacy Act (FERPA).

People. The people category was dominated by comments of being connected or making connections and wanting to be "in the know." It was a theme of defining oneself through connections, networks, fan groups, photographs, and getting event/insider information through these connections. Participants also noted that the site could provide connection to the university or to peers as a way to alleviate isolation.

One reoccurring theme not mentioned in the model for community-based online learning was the concern about over-sharing: Sharing too much inappropriate information. For example, one female faculty member commented, "sometimes you see things you don't want to know or people really wouldn't share in another venue."

Other relevant. Two categories of comments emerged that did not fall into other categories: Concerns about student communication skills and concerns that there are too many networking sites.

Only faculty and employers commented about student communication skills, specifically how this community may not benefit students with social anxiety or oral-communication issues as it provides another avenue to keep students physically disconnected. For example, a male employer commented:

> *I personally think that today's youth, and many adults, hide behind texting, e-mails, MySpace, etc. No one picks up a phone or talks face-to-face. This is a VERY important part of the working world and we need to stimulate that by making them communicate at work and school verbally. We don't want them to sound like idiots when they open their mouths. The more verbal communication they do, the easier it becomes and teaches them how to deal with the "butterflies" of speaking in front of groups. Technology is great, but we can't let it consume our lives.*

Findings cycle 2. Cycle 2 addressed the second research question of how participants' design ideas and experiences using the community influence the community design. More than 800 comments were collected from the participants in the second cycle. The summary of comments by category is shown in Table 3.

Table 3. *Phase 2 Survey: Rank Order and Number of Comments for Each Model Category*

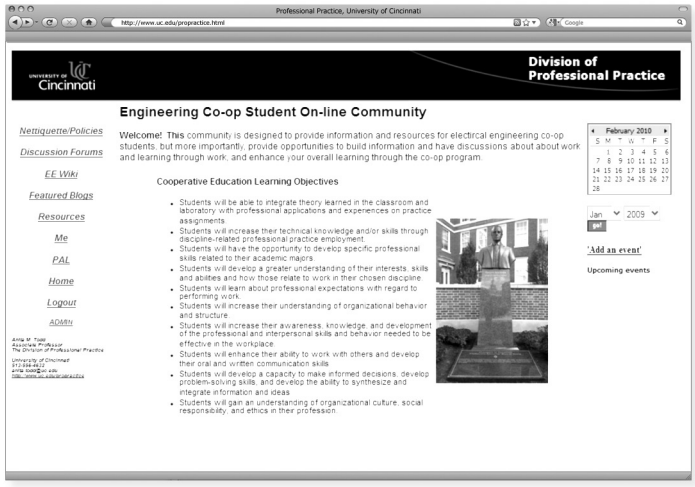
Category of Comments	Number of Comments	Rank
	Total	Total
Purpose	302	1
Process	169	2
People	101	3
Other Relevant	8	4
Other Irrelevant	228	
Total	808	

Purpose. In Cycle 2, the practical consideration comments focused on the look and flow of the community. Pages had too much text and not enough graphics (see Figure 1.), the menu was confusing in its order and labeling, and the site was not as consistent in appearance from page to page.

Participants indicated the need for moderation and oversight. Employers were concerned it could become a place to vent or criticize their company.

Participants were still concerned about the specific community purpose and if students would participate. Some participants suggested making it mandatory or making some level of participation mandatory. Participants again indicated that the community needed to be professional and not social in nature.

Figure 1. *Initial design of the home page of the online prototype community*



People. The resources section was designed to provide information for students to be "in the know" and the strength of the resource section was the most common comment from the entire survey. Participants also liked the calendar, but suggested that it be downloadable. Participants also suggested adding RSS feed capability so students could get updates and a dashboard that indicated the most recent updates (similar to Facebook).

Process. The majority of comments in the process category indicated that the interactive components of the community (e.g. wiki, blog, forums) were of value. Some participants indicated a concern over the depth of reflection possible within these elements.

Other Relevant. Once again, participants raised the issue of too many social networks. Participants questioned if there was an existing platform in which to build the community, such as Blackboard or Facebook.

Discussion

The community design. The initial community design evolved from the researchers' ideas for an online community design based on university cooperative-education learning objectives combined with ideas from the first cycle of focus groups and surveys. The findings highlight the influence of social networking through Facebook. Through the data collection and analysis, the researchers confirmed, changed or added features as follows:

People:

- Students can create a student profile including a picture and personal/professional information they choose to share.
- Student may post anonymously to the discussion forums.
- Students can access an events calendar to which the moderator and participants can post (see Figure 2).
- The resources section was better organized and included more items.
- Students can subscribe to RSS feed to follow changes within the community.

Purpose:

- Learning objectives and the value of the community were clearly posted on the main page (see Figure 2).
- The comprehensive netiquette section remained. Over-sharing of inappropriate content and cautions about sharing intellectual property/confidential company information was added.
- Learning objective and netiquette were added across the website in small reminders (see Figure 2).
- More pictures and graphics were added (see Figure 2). The font size, page layout, and design were made consistent across the community.
- The main menu was re-organized (see Figure 2).
- Participation was made mandatory for cooperative-education students.
- The community will be monitored by the cooperative-education faculty member.

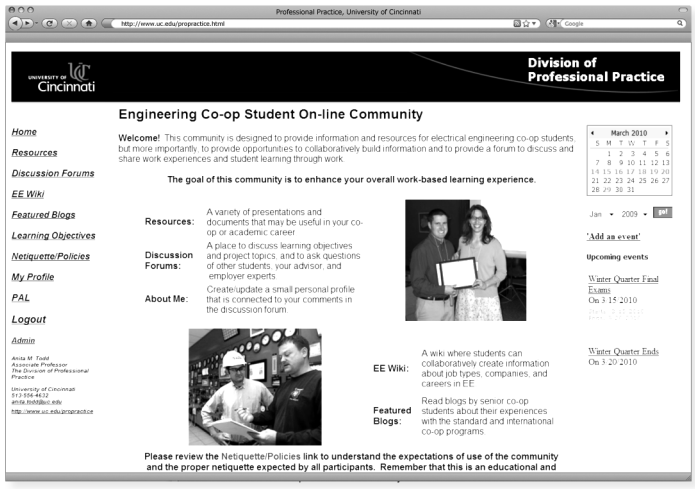
Process:

- The wiki, blogs, discussion forums, calendar and internal messaging remained.
- A chat feature to allow for real-time communication and vodcasting (i.e., posting videos) and podcasting capabilities was added.

Other Relevant Features

- The community was fully incorporated into the current cooperative-education assessment system.

Figure 2. *Revised home page*



Enhancements to the Model of Community-based Online Learning. In most cases, participant responses fell into existing categories in the community-based online learning model. One issue that was not specifically addressed in the category of people was the issue of over-sharing. When building a community, the social aspect is important in creating online identity; however, participants must be protected from inappropriate content. Sharing of company information or intellectual property is a unique issue of over-sharing specific for students at work. Palloff and Pratt (2007) suggested that sharing of inappropriate content could be addressed through defined netiquette and community moderation. With the ubiquity of social networking, over-sharing will continue to be an issue that may warrant greater emphasis in the model.

In previous online community models, technology had significant emphasis (e.g. Preece, 2000). In the model for community-based online learning, the purpose element encompasses the practical considerations in the design of the community, which can include the technology or computer systems used. However, the technology element is not explicit as a category in the model, similar to people, process, and purpose. It is recommended that a more specific emphasis on technology be included in the model.

Limitations

There were several limitations to this research study including the use of a convenience sample of engineering students, the relationship of the first author with the participants, and potential biases of the first author who was developing this community for her own use as a teaching tool within her division. Therefore, the analysis was filtered through the first author's lens (Merriam, 2001). This perspective has the benefit of providing an insider perspective and more in-depth analysis of the data; however, a certain level of objectivity was most likely sacrificed in order to gain this perspective. Given these limitations, the research is not generalizable to other populations; however, other researchers may benefit from the lessons learned and the process of how this community was designed.

Future Research

This design-based research study was the first phase of a multi-phase study to develop a tool to enhance engineering student learning through cooperative education. Once the community is finalized, future studies will address its effectiveness in increasing student interaction and reflection and their affect on student learning.

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Appendix A

Cycle 1 Survey – *Student/Employer/Faculty/Field Expert*

- What other social networking have you heard of or your friends may participate in? EX: Facebook, MySpace, LinkedIn, Others?
- Why do you participate in these communities?
- What are some of the best features of these communities? Why?
- What features work particularly well in these communities or do you think are particularly cool or clever?
- What features or activities draw you to these communities?
- What are some features that you do not like or do not work well? Why?
- What are some positive experiences you have had from participating in these communities?
- What are some negative experiences you have had participating in these communities?
- Do you think there are too many social networking sites?
- Does anyone not participate in some type of social networking site? Why not?
- While students are on co-op with your company, do you think they feel disengaged from the university? Why or why not?
- Do you think an online community for students specifically on co-op would be beneficial? Why or why not?
- What might be some of the benefits that you could see from this type of community?
- What might be some of the negatives of having a community like this?
- Would you be concerned if students were participating in this during work hours?
- What type of features would be beneficial to students — think about seeking work students, job changing students, first-time co-ops, last time co-ops, international co-op, and other groups of students?
- As we get started — do you have any ideas or suggestions to make the community engaging?
- Any other comments or suggestions?

Appendix B

Cycle 2 Survey – *Student/Faculty/Employer/Field Expert*

The purpose of this survey is to gather your opinion about the initial version of the Virtual Community for Co-op Students. You may want to have the community open in another window so you may refer to it if needed to answer questions.

- Did you have any technical problems accessing the community or using any features in the community?
- Please explain the problem(s) and where it (they) occurred.
- Did the explanations/text in the site make sense? If not, please explain?
- Was the site easy to navigate? If not, what suggestions do you have?
- Were you able to find the features desired? If not, what suggestions do you have?
- Was the site aesthetically pleasing (nice looking)? If not, what suggestions do you have?
- What features did you like most? Were most useful? Why?
- What features did you not like? Were not useful? Why?
- Based on you participation in the first focus group, do you think the site was developed in response to your ideas and suggestions? If not, what is missing?
- What are your suggestions for improvements or changes?
- Were co-op resources obvious to you?
- Do you think the community can meet the purpose of increasing social interaction among co-op students?
- Why/Why not?
- Do you think the community can meet the purpose of increasing social collaboration (working/learning together) among co-op students?
- Why/why not?
- Do you think the community can meet the purpose of increasing reflection about the co-op work term?
- Why/Why not?
- In your opinion, does the community serve any other educational / assistive purposes for co-op students?
- Do you think participation requires too great a time commitment vs. the potential benefit?
- Would you like to see this implemented as an educational tool for students at all levels from seeking work through your senior year?
- Other thoughts, comments, suggestions?

Thank you so much for your time.

Professionalising Accounting Education – The WIL Experience

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Abstract

The study tests the impact of an undergraduate business degree with significant Work Integrated Learning (WIL) components on student satisfaction, self-efficacy, and generic skills development compared to students undertaking a traditional business degree. The article adopts a longitudinal survey methodology of two sample groups: A control group studying a traditional business degree ("Control Group"); and a group of students enrolled in the WIL business degree ("PD Students"). The survey instrument, which contained self-reported Likert scale measures of self-efficacy, generic skills, and satisfaction, was administered at the beginning of the students' first, second, and third year of study.

We find that the WIL business degree has had a positive influence in terms of student satisfaction, self-efficacy, and generic skills development and these measures are more pronounced than students completing the traditional business degree. The study extends the research on generic skills in business education and supports empirical evidence of WIL as a method of achieving greater student satisfaction with their academic experience, enhancing student self-efficacy, and developing students' generic skills. Despite its resourcing issues, this study provides initial evidence to support further investment by higher education and industry in WIL activities within accounting education.

Keywords: Work Integrated Learning, Generic skills, Accounting education, Employment, Professional Development, Graduate Outcomes.

Introduction

Universities are becoming more conscious of the need to develop not only the key technical skills of their students, but also to develop students' generic skills[2] (ACCI & BCA, 2002; AC Nielsen, 2000; Australian Education Council, 1992). Despite this increased awareness, various surveys have identified underlying concerns of industry with students' generic skills (Kavanagh & Drennan, 2008; Precision Consultancy, 2007). Kavanagh and Drennan's study of accounting students and employers identified that tertiary programs

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2 Also referred to as 'graduate attributes', 'graduate skills' or 'employability skills'.

in accounting do not appear to be adequately developing the students' professional skills and awareness (Kavanagh & Drennan, 2008). This raises the issue of how universities can provide their students with opportunities to develop their generic skills.

To address this critical issue, a Work Integrated Learning (WIL) commerce degree was introduced at an Australian University (the Professional Degree). This degree is supported by an integrated continuous orientation program, known as the Professional Development Program (the PD Program), which was created to develop student attributes, academic and professional skills. Preliminary evidence suggested that this program had a positive impact on first year students in comparison to those in *traditional* programs (Freudenberg, Brimble, & Cameron, 2010). This article extends the analysis to include students across all three year levels to determine if the first year impact holds across the second year of the program during which students complete the first year of an internship. This is achieved with a survey of self-reported measures of student development (satisfaction, self-efficacy, and generic skills) and compares this with a group in a traditional commerce degree.

We find that the WIL business degree has had a positive influence in terms of student satisfaction, self-efficacy, and generic skills development and that this continues into the second year of the program with the continued PD Program and the commencement of an internship. This extends and improves our earlier results and suggests that it is not a short-term effect. Furthermore, these measures are more pronounced than students completing the traditional business degree.

WIL has become more prominent in tertiary education as attempts are made to improving students' generic skills and bridging the student skills-employer expectation gap.

The remainder of the article is structured as follows. The next section examines the literature considering the potential WIL has on student satisfaction, self-efficacy and generic skills. Then the research method, including the design of the Professional Degree is discussed. This is followed by a discussion of the results. The article concludes with limitations and the potential for further research.

Theoretical Background

Work integrated learning (WIL)[3] integrates learning and its workplace application in an educational setting and can be achieved through a real or simulated activity in or out of the workplace[4] (Atchison, Pollock, Reeders, & Rizzetti, 2002, p. 3). WIL has become more prominent in tertiary education as attempts are made to improving students' generic skills and bridging the student skills—employer expectation gap (Bradley, Noonan, Nugent, & Scales, 2008; Patrick et al., 2008; Universities Australia, 2008). This is based on evidence that WIL improves the tertiary education *product* and therefore the outcomes for all stakeholders including student satisfaction. The latter has also become increasingly important as universities are increasingly measured and funded by performance in this regard.

3 There are a number of terminologies used to describe WIL, including cooperative learning and service learning. However the term WIL is used in this paper for consistency.

4 There are a number of possible models for a WIL programme, such as Mentored Employment, University/Industry Research; Supervised Work Experience, Customised Accredited Workplace Learning, Enterprise Development and Entrepreneurial Programs, and Simulations (Atchison et al., 2002).

This study examines the impact of a WIL project which imbeds both the preparation and delivery of WIL within the degree structure. To measure this impact we examine three student attributes commonly associated with WIL: satisfaction; self-efficacy and generic skills.[5]

The literature suggests that WIL offers engaging learning experiences that contribute to student satisfaction with their education experience (Patrick et al., 2008, pp. 20-21; Precision Consultancy, 2007, p. 29;) and this is confirmed by Australian evidence which recognises the relationship of WIL to student engagement and satisfaction (Australian Council for Education Research (ACER), 2008; Scott, 2005). In particular the Scott study noted that students single out engaging learning methods such as Practice-orientated (which includes WIL methods[6]) and interactive, face-to face learning methods as the *best aspects* of their degree. In a broader study (students from 25 Australasian institutions) student satisfaction was linked to engagement scales and quality of educational experience, with the WIL scale producing one of the strongest positive relationships with re-enrolment intentions (ACER, 2008, pp. 22-23). In summary, the literature suggests that WIL activities can positively impact on student satisfaction.

In a higher education context, self-efficacy[7] has a significant influence on student behaviour. Self-efficacy can affect a students' academic persistence, choice of career opportunities, career competency (Bandura, 1982), individual performance and satisfaction (Bandura, 1997; Chowdhury, Endres, & Lanis, 2002; Gist & Mitchell, 1992). For example, students with higher self-efficacy can better utilise cognitive strategies (Zimmerman, Bandura, & Martinez-Pons, 1992) and can be better at solving conceptual problems (Bouffard-Bouchard, Parent, & Larivee, 1991). Prior studies have demonstrated significant improvements in student self-efficacy through participation in WIL activities including improved attitudes and behaviours toward work readiness (Day, Kelly, Parker, & Parr, 1982; Hughes & Moore, 1999; Freudenberg, Brimble, Vyvyan, & Corby, 2008; Subramaniam & Freudenberg, 2007).

Generic skills development has been a key focus in curriculum changes and renewal in recent years and has been promoted by stakeholder views (and evidence) that suggests an expectation gap exists between the employers/students and what is being delivered by tertiary programs (Kavanagh & Drennan, 2008). For example, the ICAA and CPA Australia have devised accreditation criteria, which explicitly requires universities to include generic skills development in their programs (Institute of Chartered Accountants [ICAA] & CPA, 2009).

The benefits of generic skills are also not restricted to employer demand and better graduate employment prospects; they are also transferable—from university to the workplace and between workplaces. Whilst technical knowledge becomes dated, generic skills rarely become obsolete and can be transferred into new careers (Kavanagh & Drennan, 2008, p. 281). WIL can equip students with generic skills and facilitate their transfer into the workplace (Crebert, Bates, Bell, Patrick, & Cragnolini, 2004) and it is therefore not surprising that higher education institutions are utilising generic skills research to justify the implementation of WIL activities and to devise WIL curriculum (Litchfield, Nettleton, & Taylor, 2008).

5 For a more detailed discussion of these factors refer to Freudenberg (2010).

6 There are 20 learning methods ranging from artistic productions, camps, the use of 'real world' case studies, field placements, practicum and clinical placements, to the use of key practitioners as guest lecturers or mentors, site visits, service learning and travel to other universities and overseas study exchanges.

7 Self-efficacy has been described as individuals' beliefs, thoughts and feelings about their capabilities (Bandura, 1977, 1986).

Research Methodology

A longitudinal survey methodology is used to examine the impact of the Professional Degree on enrolled students (the PD Students) over the first two years of the degree. The survey was administered at the start of the university year in *orientation week* in an attempt to capture students prior to engaging extensively with the university. The survey was readministered 12 months and then 24 months later at the start of the students' second and third year to gauge the level of student development. In addition, a group of students in a similar degree, that does not include the internships and the PD Program (the Control Group), were surveyed at similar times, and across year levels, as the primary sample.

Design of the professional degree. The design of the Professional Degree encompasses opportunities for students to improve self-efficacy and generic skills, with a view to improving overall student learning and employment outcomes and satisfaction. This is delivered in a trimester mode, which is a ten week trimester with approximately 35 hours contact per course with students studying full-time for their first year, and then converting to part-time study for their second and third years while undertaking a two-year paid, three to four day a week internship.

To ensure that students are adequately equipped for the WIL experience represented by the internship, as well as for their academic studies, the Professional Degree is supported by the PD Program, which is designed to create a meaningful link between university and the profession. The PD Program is designed for the systematic development of students' learning, employment, and generic skills while providing students with industry knowledge, professional skills, and exposure to partner firms. A critical factor in the success of the PD Program is the involvement of industry with its design and delivery. The PD Program is delivered in the days prior to the start of each trimester (known respectively as PD#1, PD#2 and PD#3), in each of the students' three years of study. In this way the PD Program is a *continuing orientation program* in which all students in the Professional Degree (commencing and continuing) participate. The PD Program is structured to deliver key skills and knowledge to students depending upon their progression (1st, 2nd, or 3rd year) and provide opportunities for mentoring and socialising through a "Pod" system of students, industry representatives, and academics.

The PD Program achieves continuous orientation by: scaffolding generic skills development, industry awareness, and exposure in each trimester in each year of the degree; and tailoring the PD program to the unique student life cycle that the business degree generates. Whilst some components of the PD Program are currently delivered elsewhere in the university, they are generally stand-alone rather than integrated and timed so students may not appreciate their significance. Further, these centralised services can be generic rather than contextualised to the students' actual discipline. It is argued that the PD Program's incorporation of these existing services in an integrated and considered way will improve outcomes and contextualise them for students.[8]

8 Due to space constraints we are unable to provide a detailed overview of the three year PD Program. Further information can be obtained by contacting the authors.

Survey instrument. The survey instrument incorporated standard demographic questions followed by questions about the students' satisfaction, perceptions of self-efficacy, and generic skills. In terms of satisfaction, students were asked a number of questions concerning their satisfaction with their choice of degree, university, courses, experience at the university, fellow students, lecturers, contact with industry, industry in which they expect to enter on graduation, and the relevance of the degree to their perceived professional needs. Students rated their level of satisfaction on a seven point scale from (1) unacceptable to excellent (7). A 21 item measure of self-efficacy was formulated by drawing on the existing literature concerning task-specific and general self-efficacy (Bosscher & Smit, 1998; Chen & Gully, 1997; Kirk & Brown, 2003; Subramaniam & Freudenberg, 2007). Self-efficacy was rated on a five point scale from 1 (not confident at all) to 5 (very confident) and subsequently adjusted to a seven point scale in order to compare the results with the generic skills and satisfaction measures.

The generic skills component of the survey instrument was based on the inventory tool developed by Lizzio and Wilson, who grouped skills and areas of their application into 14 skill domains (2004, p. 15). The survey instrument utilised 10 of the 14 skill domains. Nine of the 10 domains relate to generic skills, namely: interpersonal skills, self management skills, learning and adaptability skills, problem solving skills, concept and analysis skills, oral communication, team skills, information literacy skills, and written communication skills. The domain 'career and vocational management' was also measured. Each domain has 15 statements to ascertain students' perception of their skills, evaluated on a seven point scale from (1) "not at all a characteristic of me" to (7) "very characteristic of me." The final three statements of each domain relate to the student's perception of how important the generic skill is in relation to study, career and the student's desire to develop the skill. Analysis of student responses to the final three statements is considered separately.

Descriptive statistics. A total of 260 useable student surveys resulted from the administration of the survey (it was not mandatory for students to participate). Of these, 67 were from the PD Students in first year, 34 in the second year and 18 in the third year.[9] For the Control Group 27, 49, and 72 respondents in the first, second, and third year surveys respectively were surveyed in class from students in these year levels at two points in time to obtain the sample. Summary descriptive statistics for the samples are provided in Table 1. Between the PD Students and the Control Group there are differences in terms of the population of international students, as there is a greater percentage of international students within the Control Group, which is driven by the makeup of that campus.

9 Students surveyed where those present at the PDP activities. The number declines in year two as this includes only the intern students. The third year data is only students who transferred into the program mid-stream and hence the comparatively small sample. The control group has grown in size and a larger sample size was sought. Analysis of the data needs to consider this.

Table 1. *Descriptive Statistics*

	PD STUDENTS			CONTROL GROUP		
Item	**First Year**	**Second Year**	**Third Year**	**First Year**	**Second Year**	**Third Year**
N	67	34	18	27	42	72
Gender						
Male	27 40%	12 35%	7 39%	16 59%	15 36%	37 51%
Female	40 60%	22 65%	11 61%	11 41%	27 64%	35 49%
Type						
Domestic students	62 93%	32 94%	18 100%	20 74%	15 36%	27 38%
International	5 7%	2 6%	0 0%	7 26%	27 64%	45 62%
Age						
Less than 20	42 63%	8 53%	11 61%	14 52%	6 14%	3 4%
20-30	19 28%	12 35%	5 28%	9 33%	31 74%	63 88%
30-40	4 6%	0 0%	0 0%	4 15%	3 7%	4 5%
>40	2 3%	4 12%	2 112%	0 0%	2 5%	2 3%
Entrance Score	10.2	8.9	9	10.8	9.7	9.7

This table provides summary descriptive statistics of surveys students. Entrance score refers to the average OP (Overall Position) university entry score of the respondents.

Results and Discussion

Summary survey results for all the measures are contained in Table 2 and Table 3 across the two data sets (the PD Students and the Control Group) and at three points in time (at the start of their degree and at the start of their second year, and then the start of their third year). The data presented are averages of respondent's scores for satisfaction, self-efficacy and then each generic skill.

For the PD Students there was a marked increase in all attributes at the start of their second year compared to the start of the first year at university with increases ranging from 11.1% (for conceptual and analytical skills) to 31.8% (for overall satisfaction): Table 2. In contrast, the Control Group had the reverse experience after their first twelve months of study with declines in all factors but one (student satisfaction that rose (0.42%). This difference has previously been cited as initial caution amongst PD Students about their skills and degree choice (being a WIL intensive degree), overconfidence and/or naivety from Control Group students about their skills, and the positive influence of the PD Program itself, a continuous orientation program with heavy involvement of industry in its delivery (Freudenberg *et al.*, 2010). Importantly, this pattern persists in our second year of data, supporting the first year initial findings.

It should be noted that the PD Students are studying full-time in their first twelve months, with their internship not commencing until the start of their second year. Accordingly, at the start of their third year, the PD Students have completed approximately 12 months of a paid internship. The results reported demonstrate a slight increase (equal or less than 2%

change) in five of the measures compared to the start of their second year: Table 2. The five measures that have increased were: satisfaction, self-efficacy, concept and analysis (initiative), information literacy, and career and vocational skills. With the exception of "learning & adaptability" (8.84%) and "problem solving skills" (4.35%) all of the decreases in the other seven measures are only slight (being equal or less than 2%). These are also the only two areas that report lower scores than that of the Control Group 3rd year students.

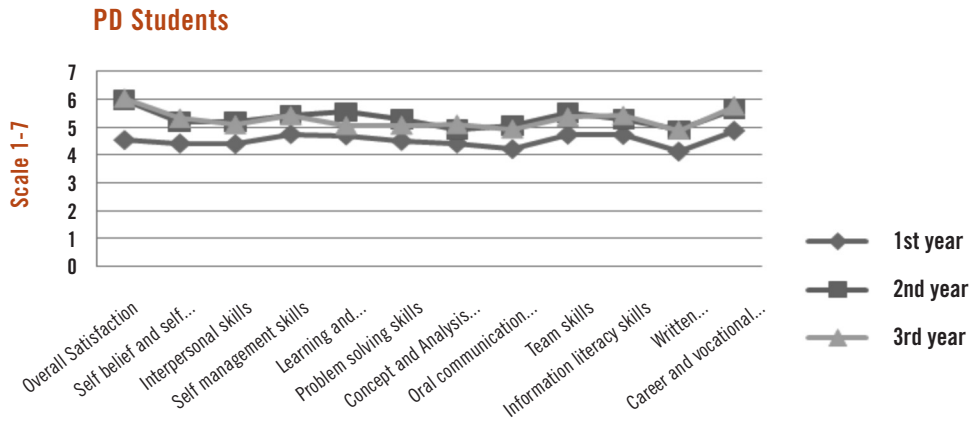
The results suggest that PD Students, after completing 12 months of an internship position at the start of their third year within the degree, may have an improved understanding of their skill base. That is, students are making a more meaningful judgement of their actual skill level. This may be because students are receiving feedback, (either explicitly or implicitly) in the workplace about their capabilities and/or observing professionals applying their generic skills. These modelling behaviours also influence student self-efficacy. This extends the outcomes for students identified in the first year of the program and illustrates that the continuation of the PD Program and the internship have further enhanced the student experience. The movement in PD Students' reported satisfaction, self-efficacy, and skills are illustrated in Figure 1.

Table 2. *Student satisfaction, self-efficacy development and generic skill with PD Students and Control Group.*

Student Attribute	PD STUDENTS First Year	PD STUDENTS Second Year		PD STUDENTS Third Year		CONTROL GROUP First Year	CONTROL GROUP Second Year		CONTROL GROUP Third Year	
	Score	Score	% Chg	Score	% Chg	Score	Score	% Chg	Score	% Chg
Overall Satisfaction	4.53	5.97	31.8%	6.04	1.17%	4.79	4.81	0.42%	4.85	0.83%
Self belief and self-efficacy	4.41	5.20	17.9%	5.31	2.12%	5.18	4.83	-6.76%	5.01	3.73%
Interpersonal skills	4.39	5.20	18.5%	5.08	-2.31%	5.09	4.47	-12.18%	4.80	7.38%
Self management skills	4.74	5.44	14.8%	5.41	-0.55%	5.22	4.87	-6.70%	5.29	8.62%
Learning and Adaptability skills	4.69	5.54	18.1%	5.05	-8.84%	5.26	4.79	-8.94%	5.14	7.31%
Problem solving skills	4.50	5.29	17.6%	5.06	-4.35%	5.22	4.55	-12.84%	5.16	13.41%
Concept and Analysis (Initiative)	4.41	4.90	11.1%	5.09	3.88%	5.04	4.38	-13.10%	4.95	13.01%
Oral communication skills	4.21	5.06	20.2%	4.92	-2.77%	4.77	4.19	-12.16%	4.86	15.99%
Team skills	4.72	5.50	16.5%	5.36	-2.55%	4.97	4.44	-10.66%	5.03	13.29%
Information literacy skills	4.71	5.28	12.1%	5.41	2.46%	5.22	4.70	-9.96%	5.24	11.49%
Written communication skills	4.12	4.89	18.7%	4.88	-0.20%	4.73	4.47	-5.50%	4.84	8.28%
Career and vocational skills	4.86	5.66	16.5%	5.76	1.77%	5.28	4.80	-9.09%	5.19	8.13%

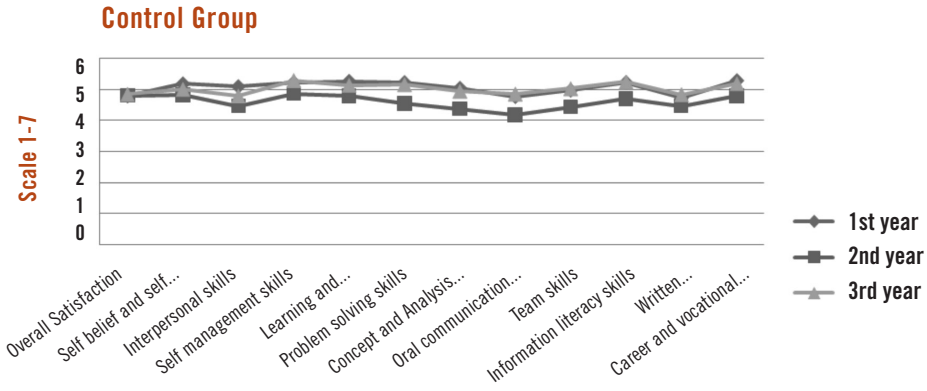
This table provides summary survey data results from four surveys conducted in the time periods. The data presented in are averages of respondent's scores across a number of measures for each attribute (scale 1 -7, with 7 highest).

Figure 1. *Reported satisfaction, self-efficacy and skills: PD Students*



For the Control Group they have increased in all of the reported measures at the start of their third year compared to the start of their second year—with each of their generic skill improvements being equal to or greater than 5%. Over the course of their studies the Control Group appear to have an oscillating experience (notwithstanding sampling difficulties) and their outcomes are lower at the start of their third year than the PD students, except two, being "Learning & Adaptability" and "Problem Solving Skills." This variance may also influence the student satisfaction score, which is significantly lower for the third year *traditional* students at 4.85 compared to 6.04 for the PD/Intern Students. The movement in reported satisfaction, self-efficacy, and skills of the Control Group are illustrated in Figure 2.

Figure 2. *Reported satisfaction, self-efficacy and skills: Control Group*

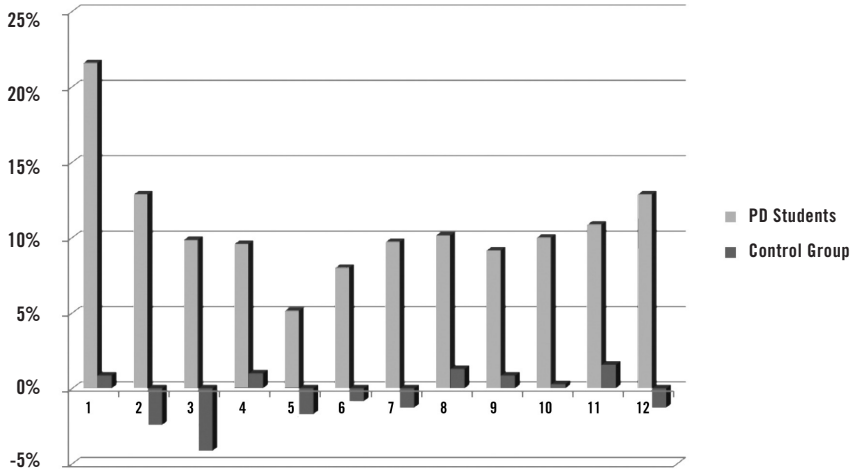


The percentage of change for both groups of students at the start of their third year of study (24 months) compared to when they commenced in year one (0 months) produced significant results. For the PD Students, nine of the measures had an equal or greater than 10% positive change over the period (being in satisfaction, self-efficacy, interpersonal, self management, concept & analysis, oral communication, information literacy, written

communication and career & vocational). The other three measures had an equal or greater than 5% improvement. This would indicate that the PD Students are finding their university experience with WIL supported by the PD Program as positive. The results are consistent with previous studies that WIL can provide an engaging learning environment that enhances the university experience (ACER, 2008; Scott, 2005).

In comparison, the Control Group appears to have stagnated, with little or no change (either positive or negative) in all measures—as all changes were less than 5% over the course of their studies. The variance from year to year may also influence student engagement and retention and, therefore, overall satisfaction. The results suggest a student perception that their university experience has had little or no influence on the development of their self-efficacy and generic skills. The 1% change in overall student satisfaction is therefore not surprising. This percentage change for the Control Group is illustrated in Figure 3.

Figure 3. *Percentage change in measures in 3rd year compared to beginning of 1st year*



Refer to Table 2 for the numbering of the student attributes

Table 3 outlines the perception of the importance of generic skills by both student groups. The PD Students consistently rate importance over 6 (on a 7 point scale)—with an average of 6.19 in their third year. For the Control Group over their university experience, these students perceive generic skills as less important—with an average 5.46 at the start of their 3rd year. Indeed, the decrease in the perceived importance of generic skills has been equal to or greater than 10% in eight of the ten measures over the two years of study for the Control Group. Conversely, the PD Students' movements in perception were equal to or less than 3% in either direction.

This *perception* of importance of generic skills is critical, as prior studies have demonstrated that employers posit that students are lacking in these skills. Accordingly, the students in the Control Group may be underestimating the importance of generic skills and consequently

failing to undertake adequate steps to improve them. This highlights a critical aspect of WIL in contextualising the need for generic skills development in additional to providing the development itself.

Taken together, the results support the effectiveness of a Professional Degree, with WIL, in terms of the impact on students' skills, self-efficacy, perception of the importance of generic skills, and overall satisfaction with their program over a 24-month period. This is in line with the prior theoretical and empirical research on WIL and provides further evidence in support of investment in significant and embedded WIL activities in accounting programs.

Table 3. *Student desire to improve generic skills with PD and non-PD Programs*

Student Attribute	PD STUDENTS First Year	PD STUDENTS Second Year		PD STUDENTS Third Year		CONTROL GROUP First Year	CONTROL GROUP Second Year		CONTROL GROUP Third Year	
	Score	Score	% Chg	Score	% Chg	Score	Score	% Chg	Score	% Chg
Interpersonal skills	6.04	6.24	3.3%	6.28	0.64%	5.96	5.37	-9.90%	5.18	-3.54%
Self management skills	6.39	6.27	-1.9%	6.37	1.59%	6.41	5.80	-9.52%	5.71	-1.55%
Learning and Adaptability skills	6.19	6.21	0.3%	6.02	-3.06%	6.23	5.48	-12.04%	5.14	-6.20%
Problem solving skills	6.23	6.36	2.1%	6.09	-4.25%	6.44	5.55	-13.82%	5.59	0.72%
Concept and Analysis (Initiative)	5.97	5.98	0.2%	6.07	1.51%	6.07	5.33	-12.19%	5.42	1.69%
Oral communication skills	6.24	6.61	5.9%	6.07	-8.17%	6.47	5.51	-14.84%	5.44	-1.27%
Team skills	6.21	6.42	3.4%	6.24	-2.80%	6.22	5.44	-12.54%	5.38	-1.10%
Information literacy skills	6.30	6.29	-0.2%	6.19	-1.59%	6.28	5.42	-13.69%	5.48	1.11%
Written communication skills	6.22	6.62	6.4%	6.39	-3.47%	6.35	5.45	-14.17%	5.54	1.65%
Career and vocational skills	6.26	6.45	3.0%	6.22	-3.57%	6.19	5.44	-12.12%	5.72	5.15%

This table provides summary survey data results from four surveys conducted in the time periods. The data presented in are averages of respondent's scores across a number of measures for each attribute (scale 1 -7, with 7 highest).

Limitations and Future Research

The limitations of this study include the short time frame of the analysis, the variation in the sample sizes across the three years in both student groups surveyed and student demographics in each group: Table 1. For example, there is a larger proportion of students in the Professional Degree who are first in their family to attend tertiary education compared to the Control Group students (Freudenberg et al., 2010) and a greater number of international students in the Control Group. In particular, the measures of the Control

Group appear to vary greatly from year to year. This may be representative of the variance of experience possible in a university degree or may highlight an underlying problem in the survey or its administration.

Further, student perceptions about their skills development may not reflect their actual level of generic skills. In the unique context of a WIL business degree, we argue that PD Students are better placed to accurately measure their generic skills after undertaking one year of their internship during which they have the opportunity to apply their generic skills, receive feedback, and observe the use of generic skills by other professionals. To support the survey instrument, we propose to implement more objective measures by asking students and industry to participate in open ended interviews and an exit survey at the end of the PD Students' three years of study, at which time a larger data set will also be available.

Despite the resourcing issues of devising and implementing WIL into the curriculum, the evidence supports the potential of such WIL activities to add significant professional substance to accounting education.

Conclusion

This article details the impact of a WIL Professional Degree on students' development over a two-year period compared to those undertaking a traditional business degree. The evidence reveals that the Professional Degree has had a positive influence in terms of student satisfaction, self-efficacy, and generic skill development. In particular, the Professional Degree students have experienced greater development than their traditional counterparts. Our evidence suggests that a continuation of the PD Program into the second year of study and the commencement of the internship have further improved the experience of and outcomes for students. We particularly note the student satisfaction scores and the recognition of the importance of (and desire to improve) generic skills by the PD Students, which are substantially higher than those of the students in the *traditional* program.

Despite the resourcing issues of devising and implementing WIL into the curriculum, the evidence supports the potential of such WIL activities to add significant professional substance to accounting education. Professionalising accounting education through WIL may improve students' generic skills and close the skills-expectation gap identified by employers of accounting graduates. This, we believe, justifies the expenditure on WIL activities given the potential return of this investment for students, employers, higher education institutions, and the accounting profession in general.

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Since 1973, the Canadian Association for Co-operative Education (CAFCE) has supported post-secondary co-operative education in Canada through its national activities and services to its member institutions and individual professionals. CAFCE's mission is to foster and advance post-secondary co-operative education in Canada. This is achieved through a national forum of professional co-op practitioners; by establishing national standards and promoting the value of co-operative education; and by delivering opportunities for learning and sharing of best practices.

There are presently 400+ members from 77 post-secondary institutions, with approximately 80,000 co-operative education students across Canada. CAFCE's strength lies in the commitment and energy of its membership who volunteer from across the country to work in partnership to establish CAFCE as the voice for post-secondary co-operative education in Canada.

CAFCE's independent Accreditation Council ensures that only the highest standards exist for our members. Member institutions are subject to rigorous evaluation before achieving accreditation status. Ongoing education and discussion of topics concerning co-operative education and professional development ensure that membership can maintain and support CAFCE's commitment for excellence.

Members were recently asked to participate in a CAFCE survey and the results showcase the value members place on creating a national community of co-operative education practitioners able to share best practices, communicate research findings and build positive collaborative relationships.

CAFCE membership provides an opportunity for growth as a co-op practitioner and helps ensure that co-op programs stay current with practices and initiatives in co-operative education while strengthening the capacity and voice of the national Association.

Benefits of membership in CAFCE include access to:

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- **professional development activities** specific to the needs of co-op practitioners including the upcoming CAFCE Whistler Conference in July 2012, the CAFCE AGM in Victoria BC in November 2011, and a new webinar being offered in early 2012.
- a **national database** that will host current and historical statistics to assist you in advocating the benefits of co-operative education to your students, employers, institutions and regions.
- **automatic WACE membership** as an enhanced part of your CAFCE membership.
- **research findings and publications** through the website, CAFCE's Best Practices, and the CEIA Journal.
- **opportunities for accreditation** to ensure consistent, high level standards across colleges and universities in co-operative education and access to the co-op manual which serves as a guide for new program implementation.
- **the presence of a national office** to ensure communication and support is available to all members across the country.

For further information on post-secondary co-operative education programs in Canada, please visit the Canadian Association for Co-operative Education web site at: www.cafce.ca .

Responding to Rapid Change in Higher Education: Enabling University Departments Responsible for Work Related Programs Through Boundary Spanning

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Abstract

Boundary spanning links organisations to one another in order to create mutually beneficial relationships; it is a concept developed and used in organisational theory but rarely used to understand organisational structures in higher education (Pruitt & Schwartz, 1999). Yet understanding boundary spanning activity has the capacity to help universities respond to demands for continuous quality improvement, and to increase capacity to react to environmental uncertainty. At a time of rapid change characterised by a fluctuating economic environment, globalisation, increased mobility, and ecological issues, boundary spanning could be viewed as a key element in assisting institutions in effectively understanding and responding to such change. The literature suggests that effective boundary spanning could help universities improve organisational performance, use of infrastructure and resources, intergroup relations, leadership styles, performance and levels of job satisfaction, technology transfer, knowledge creation, and feedback processes, amongst other things.

Our research aims to put a face on boundary spanning (Miller, 2008) by contextualising it within organisational systems and structures in university departments responsible for *work related programs* i.e. Work Integrated Learning (WIL) and Co-operative Education (Co-op). In this paper these approaches are referred to collectively as work related programs. The authors formed a research team in Victoria, British Columbia in 2009 at a sponsored international research forum, *Two Days in June*. The purpose of the

invitation-only forum was to investigate commonalities and differences across programs and to formulate an international research agenda for work related programs over the next five to ten years. Researchers from Queensland University of Technology, University of Cincinnati, Baden-Wuerttemberg Cooperative State University, University of Ottawa, and Dublin City University agreed that further research was needed into the impact stakeholders, organisational systems, structures, policies, and practices have on departments delivering work related programs. This paper illustrates how policy and practice across the five institutions can be better understood through the lens of boundary spanning. It is argued that boundary spanning is an area of theory and practice with great applicability to a better understanding of the activity of these departments. The paper concludes by proposing topics for future research to examine how boundary spanning can be used to better understand practice and change in work related programs.

Keywords: Boundary spanning, work integrated learning, co-operative education, organisational frames, permeability, transitions.

Background

Boundaries establish demarcation lines for the domains of tasks and people which an organisation stakes out for itself. Boundaries also serve as mechanisms to secure a certain amount of organisational independence from the environment. It is important to note that organisations differ in the degree of permeability of their boundaries. Permeability, in this regard, is defined as "the extent to which marginal outsiders participate in or influence organizational activities" (Corwin & Wagenaar, 1976, p. 472). Boundary spanning has been recognised as contributing to new and productive practices and a key ingredient in knowledge transfer across organisations (Carlile, 2002). Carlile (2004) pointed out, however, that there are practical and political challenges when knowledge must be shared across different domains. He argued that it is not just that communication is hard but that individuals must have the capacity to manage knowledge in practice that is localised, embedded, and invested in practice. Traditionally, studies of human development assume that the processes of knowledge and skill acquisition are hierarchical, and thus vertical. However, Beach (1999) argued that learning at work is a horizontal process, whereby learners acquire forms of knowledge embedded or situated in specific contexts. This situated knowledge can take a variety of forms: It might be knowledge about how to participate in a community of practice, to change and vary work practices, or to connect different pieces of codified knowledge together to resolve work problems. For example, for students to benefit from work related programs, they need to learn how to successfully span boundaries and to negotiate learning in work and university contexts.

For students to benefit from work related programs, they need to learn how to successfully span boundaries and to negotiate learning in work and university contexts.

A concise definition of boundary spanning is not easy to find. However, a characteristic of boundary spanning is that it is a process of horizontal development. That is, "learners have to develop the capability to mediate between different forms of expertise and the demands of different contexts, rather than simply bringing their accumulated vertical knowledge and skill to bear on the new situation" (Bernstein, 1996; Griffiths & Guile, 2004, p. 69). Leifer and Delbecq (1978) defined boundary spanners as those who operate at the periphery or boundary of an organisation and who facilitate information exchange between an organisation and its task environment. Within the context of work related programs in higher education these boundaries are recognisable within the institution as an entity interacting with employment locations as separate entities. While students are affiliated with both organisations, the educational institution and the employer, each organisation operates under its own autonomous authority. In this way boundary spanning activities link one organisation to another in order to create mutually beneficial relationships.

Boundary spanning for students undertaking work related programs requires support for re-situating knowledge and skills in different contexts.

This is particularly important from a student perspective because increasingly, workers are expected to act as boundary spanners between activity systems, or to have the ability to contribute to the development of innovative forms of social practice, producing new forms of knowledge (Griffiths & Guile, 2004). Boundary spanning for students undertaking work related programs requires support for re-situating knowledge and skills in different contexts. In the knowledge economy learners need to develop the confidence to cross organisational boundaries between different, and often diverse, communities of practice. They must connect their knowledge to that of other specialists, variously in educational institutions, workplaces or the broader community. An emerging model of this activity takes greater account of the influence of the context (i.e. the organisation of curricula and work) upon student learning. This is influenced by the extent to which learners have opportunities to participate in a range of practices that support learning through work experience, and how far work related programs support learners to mediate between theoretical and everyday knowledge in order to create new knowledge and new practices (Griffiths & Guile, 2004; Peach & Matthews, 2011). For this to occur, learning is required to contribute to the transformation of work contexts, suggesting in turn that there is an even greater demand for an innovative, connective model of pedagogy and learning in work based contexts. That is, a model is needed to assist learners to cultivate the capability for boundary spanning and knowledge development (Griffiths & Guile, 2004).

What follows is an investigation of how work related programs might be better understood through the lens of boundary spanning. This includes a brief overview of relevant literature, a discussion of the benefits of work related programs, and examples of activity in four of the five participating universities that might be better understood through boundary spanning. The paper concludes with proposed areas for future research to support the way university departments responsible for work related programs can respond to rapid change.

Boundary spanning: An overview. Boundary spanning can be located in various organisational frames, as described by Bolman and Deal (as cited in Pruitt & Schwartz, 1999, p.63). These four frames can be interpreted in relation to work related programs, structures, and systems as follows:

1. The bureaucratic frame (the traditional internal hierarchy of vertical layers in an organisation) can be interpreted in relation to departments responsible for work related programs with questions like: Where in the organisational structure is the department situated? What rights and constraints in relation to external relations does this situation bring?

2. The human relations value frame gives rise to questions in relation to work related programs with regards to alternative boundary spanning activities such as informal learning, networking, community-based learning, and how other forms of mentoring are utilised in these programs (ul Hassan & Yaqub, 2010). This frame can be interpreted using a question such as: How can organisations develop so as to become open to new knowledge and networking on a level greater than that of the individual?

3. The political frame (acknowledging competition over scarce resources) prompts questions about who makes decisions in relation to work related programs especially in relation to external resources. Who has the right to administer and distribute such resources?

4. The symbolic frame (viewing actions as *theatre*, i.e. events may not always be what they seem) promotes questions pertaining to the symbolic frame of language and semiotic phenomena. For example: How is the department responsible for work related programs presented on the institution's website and what is the design of its stationery and logo?

These frames designate the locus of boundary spanning activities and to these distinctions can be added a different categorisation of moving across boundaries. Miller (2008) distinguished between organisational and cultural boundaries, arguing that these include internal vs. external boundaries, personal vs. institutional boundaries, and attitudinal stances towards boundaries, i.e. flexibility vs. rigidity. Miller (2008) and Carlile (2004) also identified several key characteristics of successful boundary spanners. Boundary spanners have a wide array of contacts and exceptional interpersonal skills, and are effective collectors and disseminators of information. Successful boundary spanners are trusted and respected by diverse stakeholders and they understand the social and organisational complexities of collaboration. Boundary spanners convene diverse and eclectic partners, assembling apparently disparate groups around shared concerns. These characteristics and attributes enable boundary spanners to move freely and flexibly within and between communities and organisations.

By contrast, Goldring and Simms (2005) claimed that the research on boundary spanners remains unclear and we need to further develop our understandings of this work in various situations. A qualitative study by Miller (2007) examined boundary spanning leadership in community-based contexts, focusing on exceptional leaders of university-school-community (USC) partnerships in two urban American regions. The findings indicated that boundary spanners are aided by contextual knowledge, interpersonal skills, trust and connectedness, further suggesting that they are motivated by an underlying community loyalty and a fundamental social consciousness. Accordingly, boundary spanners are compared with community organisers and described as "institutional infiltrators organizing for community advancement." Although leaders with the skill of those studied by Miller (2007) are rare, he suggested that effective boundary spanners could help develop sustainable boundary spanning infrastructure within their communities (Miller, 2008). Wenger (as cited in Zaitseva & Mitchell, 2007, p.317) described people who are able to make connections across communities of practice as boundary spanners or "brokers." For organisations to be agile they thus require brokers or boundary spanners with suitable attributes to understand the processes of boundary spanning, and the organisational frames within which it operates, so as to optimise the potential for an organisation's success.

Boundary spanning as a way to understand change and improve practice. Several researchers (Carlile, 2002; Lee, Ohta, & Kakehi, 2010; Levina & Vaast, 2005) highlight the value of boundary spanning in times of environmental uncertainty when an organisation's need for information is irregular and unanticipated. Organisations including university departments responsible for work related programs must understand the correlation between change, organisational approaches, and positive outcomes and the importance of organisational agility in the face of environmental uncertainty.

Successful boundary spanning has several implications for organisational agility. First, it positions these activities in a context with respect to organisational functioning, defining how an organisation interacts with its environment and how relevant information enters the organisation. This process suggests different modes of boundary spanning that rely on internal and extra-organisational factors that involve tradeoffs in efficiency and adaptability. Second, organisations need to consider the consequences for individual boundary spanners such as power, participation in decision making, and feelings of stress and satisfaction. Third, boundary spanning activities intervene between the environment and the organisation, where the organisation is an entity comprised of heterogeneous subsystems, each facing different aspects of the same global environment, and each with its discrete structure and processes (Pruitt & Schwartz, 1999). Pruitt and Schwartz (1999) argued that types of boundary spanning can be understood as:

1. **Representing** – influencing, external negotiating.
2. **Transacting** – trading and dealing with external entities.
3. **Administering** – internal negotiating.

4. **Scanning** – identifying emerging trends or events that provide opportunity or threat [relevant for relationship with external world].
5. **Monitoring** – tracking changes, trends and/or events identified as strategic [relevant for internal boundaries and relations].
6. **Protecting** – warding off external pressures which could be disruptive [managing of external influences].
7. **Linking** – establishing and maintaining key relationships with important organisations, groups and individuals [negotiating with external entities].
8. **Processing and gate-keeping** – [internal negotiation].

Such activities are discernable in behaviours, processes, and systems established in higher education institutions as ways of enabling students to transition into the workplace in the context of employers, industry, and communities. The benefits of this activity are briefly discussed in the next section.

Benefits of understanding work related programs as a form of boundary spanning. A significant concern of work related programs is the transfer of learning. Instead of understanding transfer as reapplying the knowledge and skills acquired in one context to another, transfer is more usefully viewed as a form of boundary spanning involving consequential transition. Such transitions position the learner engaged in a variety of different tasks and in a range of contexts. This transfer occurs while individuals participate in cultural practices, frequently while interacting with others having greater expertise than themselves in the workplace *zone of proximal development*. The zone of proximal development is effectively the gap between what a learner has already mastered—the actual level of development—and what the learner can achieve when provided with educational support—potential development (Engeström, 1987; Vygotsky, 1978).

A major challenge faced in work related programs is developing structures and processes across boundaries that assist stakeholders to cross social and cultural borders between education and work.

A major challenge faced in work related programs is developing structures and processes across boundaries that assist stakeholders to cross social and cultural borders between education and work. In formal learning settings, the goals of instruction are rendered explicit, the learning processes clearly stated and educators' responsibilities for intervening to support learning well defined. However, the process of boundary spanning means that the zone of proximal development is far less clearly demarcated. This is partly because learning in workplaces includes undertaking actions whose object and motive is not learning per se, but where learning may still be a by-product. The form of learning in which individuals engage when bridging the boundary between education and work or between one work context and another features horizontal development or mediating between different forms of knowledge and performance in different contexts (Tuomi-Gröhn & Engeström 2003). The responsibility for enabling students and staff to operate as boundary spanners in work related programs is shared. That is, stakeholders including

students, employers, and universities, have a role in creating environments where boundary spanning is understood, valued, and made possible so that benefits are distributed (Peach & Gamble, 2011).

Stakeholders including students, employers, and universities, have a role in creating environments where boundary spanning is understood, valued, and made possible so that benefits are distributed

The key stakeholders within this educational methodology are students, educators (institutions), and employers. Each stakeholder participates in a highly complex process involving the negotiation of multiple domains of knowledge. These stakeholders possess, at best, a partial understanding of domains other than that their own, and are possibly only capable of articulating partial knowledge within their own domain (Carlile, 2004; Hutchins, 1991; Johnson, Lorenz, & Lundvall, 2002). The triad partnerships that underpin work related programs are based to a large extent upon creating an environment of joint enterprise and an expectation, a collective mindset, and an atmosphere in which all stakeholders believe that the rewards for participation exceed the conflicts and costs (Carlile, 2002) of operating outside their own organisational domain. This perceived benefit is the driving force facilitating effective boundary spanning.

Benefits of work related programs for employers. The benefits to employers of work related programs are well documented. A study of practice at Northeastern University (Neilsen & Porter, 1983) indicated that students engaged in this activity generally perform better with respect to pre-professional employment, recruitment yield, and permanent employment performance. A study by Georgia Organization of Southern Bell found that graduates who undertake work related programs are better prepared to assume future management responsibilities (Phillips, 1978). Another study showed the cost effectiveness for companies involved in work related programs. Whilst initially expensive, the majority of organisations reported cost effectiveness by the second term of involvement. In studies commissioned by the World Association for Cooperative Education employers reported benefits including: ability to hire students for project work, access to additional help or assistance, access to enthusiastic/motivated employees, flexibility and cost effectiveness of hiring, and ability to pre-screen future employees. A national survey for the Science Council of Canada (Ellis, 1987) clearly indicated the existence of a unique role for work related programs in Canadian economic renewal, with benefits including: evaluating/recruiting full time employees and employing students who produce high quantity and quality of work. In a regional study by Dobreci (1996) for the Ministry for Education in British Columbia, employers emphasised the importance of employability skills and indicated that service and flexibility were key. A research project conducted by Van Gyn, Cutt, Loken and Ricks (1997) revealed differences for students who participate in work related programs. Testing longitudinally for the values of communication, problem solving, values clarification, functioning in social situations, using science and technology and the arts, students who participated out-performed other students on all values. Employers interviewed and surveyed for an Australian investigation into work related

programs (Patrick et al., 2009) also reported that they accrue many benefits from engagement in work related programs which in most cases outweigh the costs involved.

Benefits of work related programs for students. The benefits to students of successfully crossing the social and cultural borders between education and work include: improved learning (Linn, Howard, & Miller, 2004), improved problem solving, improved motivation to learn (Weisz, 2000), higher retention rates, and increased ability to finance tuition (Coll, Eames, & Halsey, 1997). Personal benefits include: increased autonomy; self-efficacy; self-confidence; personal agency; initiative; teamwork; cooperation; and relationship building (Apostolides & Looye, 1997; Coll & Chapman, 2001; Jones, 2007; Mueller, 1992; Peach & Matthews, 2011; Weisz, 2000; Weston, 1983). Students are also provided with significant career benefits including being better equipped to identify and clarify career options, make better career decisions, and increased employment opportunities and access to work networks (Coll & Chapman, 2000; Coll et al., 1997; DeLorenzo, 2000; Peach & Matthews, 2011).

Benefits of work related programs for institutions. Optimising the conditions for successful work related programs provides benefits to institutions such as: improvements in student recruitment, enrolment, satisfaction levels, and academic performance (Coll & Chapman, 2000; Weisz, 2001). This activity also opens up opportunities for employer involvement in curriculum development and a way of attracting new funds (Boud, 2001; Cates & Jones, 1999; Coaldrake & Stedman, 1999; Patrick et al., 2009). Table 1. summarises the key benefits of work related programs for employers, students and educational institutions.

Table 1. *Summary of benefits of work related programs for employers, students, and institutions*

Employers	• cost effectiveness in hiring • hire motivated/ enthusiastic new employees • screen students for permanent employment • interactions with college/ university • reduce recruiting/hiring costs • bring new knowledge into organisation • reduce training costs • assists in completing one time projects • encourages employees to assume management responsibilities • helps company meet affirmative action goals • co-op students hired usually remain with the company longer and progress faster than regular hires
Students	***Academic benefits include improved:*** learning , problem solving; motivation to learn, retention; ability to finance tuition ***Personal benefits include increased:*** Autonomy, self-efficacy, sense of purpose, self confidence, initiative; teamwork, cooperation, relationship building ***Career benefits include aid with:*** identification and clarification of career options, career decision making and planning, employment opportunities ***Skill development benefits include increased:*** competence, technical knowledge and skills
Institutions	Student recruitment and enrolment; improved academic performance; employer involvement in curriculum development and content; driving force in attracting new funds

Effective work related programs are distinguished by stakeholder partnerships (Orrell, 2004) and to continue to accrue the benefits summarised in Table 1., universities need to recognise the role played by boundary spanning in bringing stakeholders closer together in spaces of "strategic overlap" (Ansett, 2005). That is, sharing and assessing knowledge across boundaries to build a common knowledge that is of value to all stakeholders (Carlile, 2004).

Putting a face on boundary spanning: Work related programs. This section gives examples, provided by four of the five participating universities, of activities in departments responsible for work related programs. These examples are linked to types of boundary spanning identified by Pruitt and Schwartz (1999), namely: *representing, administering, monitoring, linking, processing and gate-keeping*. Table 2. does not provide an exhaustive list of activities undertaken by these departments but is illustrative of organizational systems, structures, policies, and practices involving boundary spanning to enable and support work related programs.

Table 2. *Linking activities undertaken and types of boundary spanning*

REPRESENTING e.g. presenting information about the institution and student affairs to external audiences to shape the opinions and responses of other organisations, groups and individuals [influencing, external negotiating]. For example, promoting the features of an institution's work related programs to industry		
Queensland University of Technology	**University of Cincinnati**	**University of Ottawa**
annual employee of choice breakfast, according recognition to high-performing students and employers.	annual employee of choice breakfast, according recognition to high-performing students and employers.	annual employee of choice breakfast, according recognition to high-performing students and employers.
ADMINISTERING e.g. designing, managing, or performing operations; setting policy in the division or university; planning in the division or university; and changing to meet new demands [internal negotiating]. For example, devising policies and procedures for the operation of work related programs		
Queensland University of Technology	**University of Cincinnati**	**University of Ottawa**
CareerHub (an electronic interface connecting employers with job- and placement-searching students) with links to the National WIL Portal. This portal is a national student management system connecting employers and their needs to students across Australia	PAL Database (for programmatic assessment and for individual student assessment. This is an interface between students, employers and academics, where students enter their registration, placement and job evaluation data, and can view their complete evaluation history.	Co-op Coordinating Committees and Regulations website,; Co-op Student Committee (CSC); Co-op Survival Guide; Student Ambassadors and Promotions, Promotions sub-committee that maintains website, email and Facebook for the CSC which creates and prints promotional material, also organises fundraising events.

(Table 2 content continues on next page)

Table 2. (continued) *Linking activities undertaken and types of boundary spanning*

MONITORING e.g. tracking changes, trends and/or events identified as strategic [relevant for internal boundaries and relations]. For example, putting systems and checks in place to ensure that a program is functioning as intended.		
Queensland University of Technology	**University of Cincinnati**	**Baden-Wuerttemberg State University**
online Learning Experience Survey (LEX) ; WIL Community of Practice established in 2005	student reporting mechanism of the Co-op experience in the Student Evaluation of the Work Term, comprising an evaluation of the work term objectives	student project reports at the end of the first and second years, features a graded oral presentation, utilises self-reflection reports in class after the completion of each practical training phase and an evaluation of practical training by the students after each phase. At the end of the third year students present a bachelor thesis dealing with a current topic defined by the training company.
LINKING e.g. establishing and maintaining key relationships with important organisations, groups and individuals [negotiating with external entities]. For example, forging connections between universities (and their students) and employer or industry groups around a particular theme.		
Queensland University of Technology	**University of Cincinnati**	**University of Ottawa**
Some of the ways industry are encouraged to partner include offering real world work placements, projects, case studies, simulations and giving guest lectures and workshops across the various disciplines and faculties	Interuniversity Council (IUC) comprised of all Presidents of Ohio's public universities. When the Ohio Board of Regents decided to set a goal of doubling participation in Co-op and internship programs by 2017, faculty members at the University of Cincinnati were asked to consult with the IUC to create recommendations regarding how to achieve that goal.	Young Entrepreneurs is a youth entrepreneurship program delivered by the Ottawa Centre for Research and Innovation (OCRI) to assist young entrepreneurs in the areas of business planning and to promote entrepreneurship as a valid career option. An associated initiative, TalentBridge, is another of OCRI's programs aimed at giving Ontario's young talent the opportunity to work closely with Ottawa-based small to medium enterprises (SMEs)
PROCESSING AND GATE-KEEPING e.g. .communicating information to key decision makers at all levels of the institution [internal negotiation].		
Queensland University of Technology	**University of Cincinnati**	**University of Ottawa**
Real World Learning Committee This committee guides the ongoing development, implementation and monitoring of real world learning at the University.	The Associate Provost and Director, who administers the Co-op program, sit on the Dean's Council as well as the Provost's Leadership Team	Committee on Quality of the Student Experience oversees the processing and gate-keeping associated with the Co-op boundary spanning. Notably the Committee includes six student representatives

These activities provide examples of successful behaviours, processes, and systems used to support work related programs and to enable students to transition into the workplace. Whilst not discussed, the limitations and associated practical and political challenges of sharing knowledge across different domains must be acknowledged. These examples highlight the importance of effective communication and the need for individual capacity to span boundaries in order to share and assess knowledge that is localised, embedded, and invested in practice (Carlile, 2004).

Conclusion

In summary, successful work related programs need systems, structures, policies, and practices that enable stakeholders to share and assess knowledge across organisational boundaries. This requires a focus on systems and structures that emphasise transitions and enable boundary spanning. This paper contributes to an understanding of the benefits of work related programs and an understanding of how effective boundary spanning can contribute to improvements in practice. The paper also acknowledges the conflicts and costs associated with efforts to creating an environment of joint enterprise and expectation. The examples of activities in departments responsible for work related programs helps to put a face on boundary spanning. These examples help us focus on ways in which enabling systems can lead to improved connective pedagogy, greater organisational agility, and a capacity for innovation in work related programs in uncertain and turbulent times. Boundary spanning brings a fresh perspective to the question of transfer of knowledge and skill between education and work. It has been our intention to initiate interest in undertaking further research in this area. For our part, we will, in the near future, focus on extending the literature review provided in this paper and on developing a more extensive analysis of the participating institutions, showcasing best practice in work related learning, and building on lessons learned from such practice.

Boundary spanning brings a fresh perspective to the question of transfer of knowledge and skill between education and work.

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