

Work Integrated Learning as an Effective Pedagogy for Enhancing Employability of Young Professionals in the Construction Industry

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Work Integrated Learning (WIL) is becoming increasingly popular as an essential pedagogy for undergraduate construction education. Active participation through WIL provides the students with an experiential learning experience in a professional environment in the industry. This paper explores the underlying factors for the effectiveness of the WIL in construction education by presenting an interesting comparative of student success and employability in a Civil Engineering Technology Co-op diploma program. Furthermore, the study also reports on how WIL is integrated in construction management baccalaureate programs across Canada. The key findings of the research reveal that WIL is an effective pedagogy for transferring technical knowledge and soft skills to young professionals that enhance their employability in the construction industry. The research findings will be valuable for all academicians and researchers involved in the development of WIL across different levels of construction academic programs.

Key Words: Work Integrated Learning, Construction Education, Employability, Student Success

Introduction

Construction is and always has been a major player in Canada's economy. It employs close to 1 million Canadian men and women and chalks up volumes of \$123 billion annually (Arain, 2013) and has been accounting for about 12% of Canada's GDP. The construction industry has a growing need for management professionals and effective project management, especially given the growing complexity of large construction projects and construction-related law (Ling and Leow, 2008). Construction requires a broad skill set in a variety of areas, and construction project managers are ultimately responsible for every aspect of their projects, including planning and scheduling project activities; managing employees, contractors, equipment and materials; project design; and budgeting (Arain and Hoffmann, 2010).

It is commonly accepted that the construction industry has, for many years, been criticized for not developing consistent projects that are on time, within budget and with high quality standard (Arain, 2007; Ling and Leow, 2008). Generally, failure to deliver successful projects has been considered in relation to schism between design and construction, lack of integration, lack of effective communication, uncertainty, changing environment, and increasing project complexity (Arain, 2005). Turner and Muller (2003) pointed out that committed and aptly trained people with high team spirit are essential for successful completion of construction projects. The capability of the construction industry to develop, procure and deliver innovative, complex and demanding projects, is driven by involvement of highly knowledgeable and skilled construction professionals (Arain, 2013). Training through experiential learning has long been identified and recognized as one of the fundamental and key processes within the construction industry to assist organizations meet the need of construction professionals with these qualities. Construction-related programs face a significant challenge of providing students with applied knowledge that works in industry (Arain and Burkle, 2011). It is, therefore, not surprising that construction programs are allocating more time in their curricula to provide students with such learning opportunities (Park and Wakefield, 2003). As a way of meeting this need, a number of technological and pedagogical innovations were designed, tested, and implemented successfully into construction programs. These innovations include internships, multimedia-based learning, service-learning projects, simulation, and games (Park *et al.*, 2003).

Workplace learning is associated with two quite different purposes, the first being the development of the enterprise through contributing to production, effectiveness and innovation and the second being the development of individuals through contributing to knowledge, skills and the capacity to further their own learning both as employees and as citizens (Harvey et al., 1998). It is imperative for undergraduate students to gain, in addition to an academic, professional or vocational education, the competencies, skills, attitudes and values that equip them to contribute to industry (Bennett *et al.*, 2000). The inclusion of WIL curricula in university programs is becoming increasingly common in the higher education sector (Abeysekera, 2006). Impetus to the WIL is provided by the Industry, which is increasingly looking for the graduates with shorter learning curve and whose skills can match the day to day challenges and needs. WIL provides one of the tools to allow academia to align the curriculum to match these needs.

Work Integrated Learning (WIL)

Work Integrated Learning (WIL) is a planned transition from the classroom to the job, and is a natural pedagogical bridge between college and the work world (Coco, 2000). WIL is becoming increasingly popular as an essential pedagogy for undergraduate construction education. The WIL process supports student in developing the ability to analyze, evaluate, reflect and resolve a range of issues that occur during the management of the construction lifecycle. The value of the WIL to the student is the learning experience itself, which integrates all of the knowledge that the student has acquired on the program and enables the student to develop and demonstrate analytical, judgmental, presentation and communication skills (Tucker, 2006; Burkle, 2010). The work placement process provides the student with an experiential learning experience as a direct result of the students' active participation in the process (Meekel and Jenkins, 2013). WIL provides an excellent opportunity to students to develop transferable skills and to be aware of the changing needs and requirements of employers (Tucker, 2006)

Numerous terms are used separately and interchangeably to describe types of WIL such as pre-course experience, sandwich courses, job shadowing, joint industry-university courses, new traineeships and apprenticeships, placement or practicum, and post-course internship, work-based learning, vocational learning, experiential education, cooperative education, clinical education, practicum, fieldwork, internship, work experience, and more. Sattler (2011) performed an extensive literature review of the influential WIL typologies proposed by various researcher which draw upon socio-cultural learning theories to identify five models of learning through work experience: traditional, experiential, generic, work-process, and connective (Guile and Griffiths, 2001); and philosophy of WIL which identifies eight generic models, and uses 16 criteria to distinguish between them (Calway, 2006). Based on extensive literature review, Sattler (2011) proposed the following typology for WIL based on study performed in context post-secondary institutes in Ontario, Canada.

- Systematic Training which is performed in the workplace and which further includes vocational education and supervised experience.
- Structured Work Experience and project based learning. Examples of such learning include field experience, co-op and Internships
- Employer/community/Institutional partnerships such as applied research projects and service-learning

Kramer and Usher (2011) state that co-op program, particular intense form of WIL, has been widely adopted in Canadian academic programs. Co-op programs are typically Semester-long paid work placements that are an integral part of an academic degree program based on alternating academic and work terms. As per Canadian Association for Co-Operative Education, a co-op education program formally integrates a student's academic studies with work experience to engaged in productive work, rather than merely observing, for which remuneration is paid to the student. Groenewald (2004) concludes that co-operative education has four core dimensions: developing an integrated curriculum; designing work components to support experiential learning; cultivating supportive employers; and creating a structure to administer, monitor, and evaluate the learning experience. Internships are less structured form of co-op program. Internship program involves the placement in the work environment but does not rotate academic and work periods as co-op program does. Internship typically takes place near the end of the study program and may involve paid or unpaid work.

Canadian Council on Learning (2009) review of international research showed that programs that included an experiential learning component contributed to increased rates of program completion. Downey *et al.* (2002) suggested through independent studies that that co-operative education resulted in improved labor market outcomes and employability for the graduates. Noted benefits to the co-op students include reduced student debt-load, higher

rates of employment, and higher rates of permanent employment. Sattler (2011) concluded that labor market benefits of co-op are greatest at the university level. Bayard and Greenlee (2009) found no difference between co-op and non co-op college graduates in earnings or employment, but reported higher earnings, higher employment rates, and lower rates of unemployment among university co-op and non co-op graduates. Haddara and Skanes (2007) concluded that the earnings advantage may be limited to certain programs and may dissipate after four or five years. Internship programs also showed benefits over non WIL programs. Gault *et al.* (2000) concluded that business interns reported receiving job offers about ten weeks earlier than the non-interns, with average starting salaries, which were 10 per cent higher. (Knouse et al., 1999) found significantly higher grade point averages, and a higher likelihood of employment, among graduates of business internship programs.

The experience and reflection of students and supervising faculty contains valuable tacit knowledge that the Program Team believes should be captured and utilized to assess the effectiveness of the learning experience and aid continuous improvement (Meekel and Jenkins, 2013). This paper explores the underlying factors for the effectiveness of the WIL in construction education, through a comparative of student success and employability in a Civil Engineering Technology Co-op diploma program. Furthermore, the study also reports on how WIL is integrated in construction management baccalaureate programs across Canada.

WIL Case Study at NAIT

NAIT's Civil Engineering Technology (CET) program offers students a choice of a regular stream or Co-op WIL stream option. The program has a first year intake quota of 90 students. All students would take the same year-one program in one of three 30-student sections. After year one, students would either remain in the regular stream in year-two (two sections) or apply for the Co-op stream (one section). The CET regular stream schedule spans four semesters over the two-year diploma program. Historically, each semester spanned seventeen weeks. However, the implementation of NAIT's new academic model has resulted in semesters spanning a fifteen week schedule.

NAIT has offered a Co-op education stream within their (CET) program for over seventeen years. Students pursuing the Co-op stream would commence a six-month Co-op WIL semester (semester three) following year-one. This first WIL term typically commences in early May and ends in October resulting in six months of relevant employment experience (normally over 1000 work hours). Students would then return to school and complete two twelve-week academic semesters (from the end of October to the end of January- semester four and beginning February to the end of April – semester five). Students would then commence their second WIL semester again from May to October resulting in another six months of work experience. Finally, students would return back to school in semester seven for an eight-week semester at the end of October and complete their academic studies in December. Hence, students would essentially complete their diploma in two and a half years. The results of the Co-op WIL stream effectively provides students twelve full months of work experience prior to graduation compared with only four months of possible work experience for regular stream students.

Benefits of WIL on Employability

Based on annual surveys from NAIT's Institutional Research department on both CET Co-op and regular stream graduates, the responders indicated the value and benefits of WIL. As mentioned earlier, there is a respondent size of approximately 30 Co-op graduates and 60 regular stream graduates each year. Over a five year sample from 2007/2008 to 2011/2012, the response rate was 57% for Co-op students and 58% for regular stream students. For statistic validity, we have combined the results into two year cluster intervals. The employment rates upon graduation for both streams are relatively high and comparable with an average of 92% over five years (NAIT, 2013). The rationale for the high rate is in part due to the high demand for skilled employees in the construction sector in Alberta.

Another indicator of the benefits of WIL is the response to the question "Return to same employer?" upon graduation. The survey results indicate that Co-op graduates return to the same employer at a rate of 32% compared to only 17% for regular stream students based on averages are over the last five years (NAIT, 2013). The conceivable explanation that Co-op graduates return to the same employer twice the rate of the regular graduate is due to the longer exposure and training durations for WIL students to determine their suitability for the scope of work expected upon graduation.

The average starting annual median salary over the last five years for Co-op graduates is \$56,620 (Canadian) compared to \$52,750 (Canadian) for regular stream students (NAIT, 2013). The ten year annual median salary by plotted at two year cluster intervals is \$48,580 for Co-op students and \$45,755 for regular stream students. Figure 1 shows the annual median salary for the last ten years

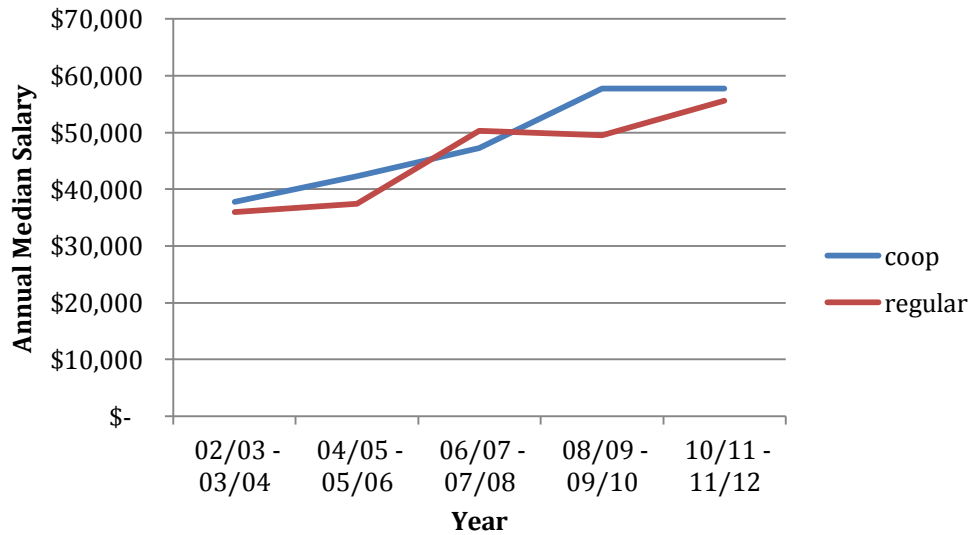


Figure 1: Annual Median Salary (in Canadian Dollars)

Benefits of WIL on Student Achievement

Based on data obtained from NAIT's Institutional Research department, there is evidence that WIL has better results on student achievement with respect to grad to quota ratios, course completion rates, and course grades.

One of NAIT's key performance indicators (KPI) is the grad to quota ratio. Graduates of the Co-op and regular streams have shown an average rate of 81% and 79% respectively over five years. The Co-op graduates have shown a strong grad to quota ratios of 87% and 93% for the last two years.

Course completion rates over the last five years indicate that Co-op students perform better than regular stream students. Co-op stream students have a 96% average course completion rate over five years compared to 92% for the regular stream students. Figure 2 shows the results from the last five years (NAIT, 2013).

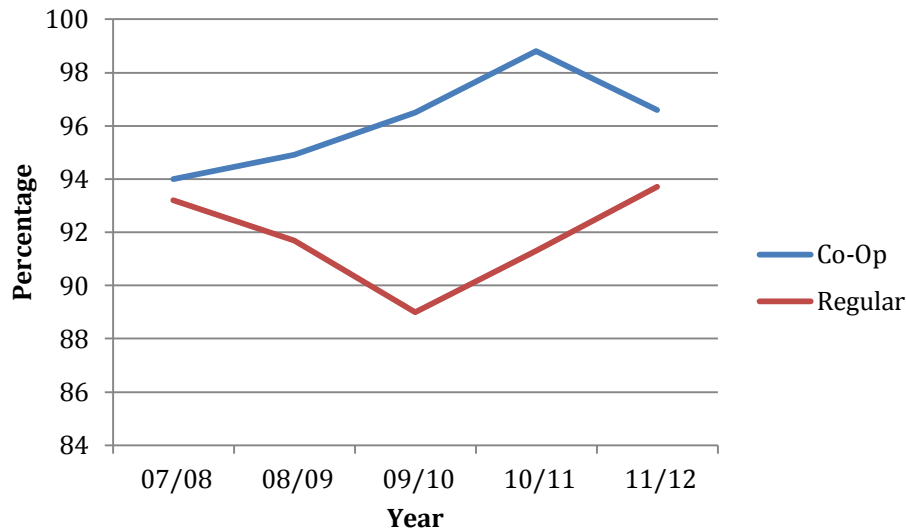


Figure 2: Course Completion Rates

The course grades students earn are higher for Co-op students than regular stream students. Over the last four years, the percentage of Co-op students that earned grades of A or A- was 37% compared to only 31% for regular stream students. The rationale for this variance could be attributed to the additional experiential learning students receive in the workplace. See Figure 3 for the annual earned grade values (NAIT, 2013).

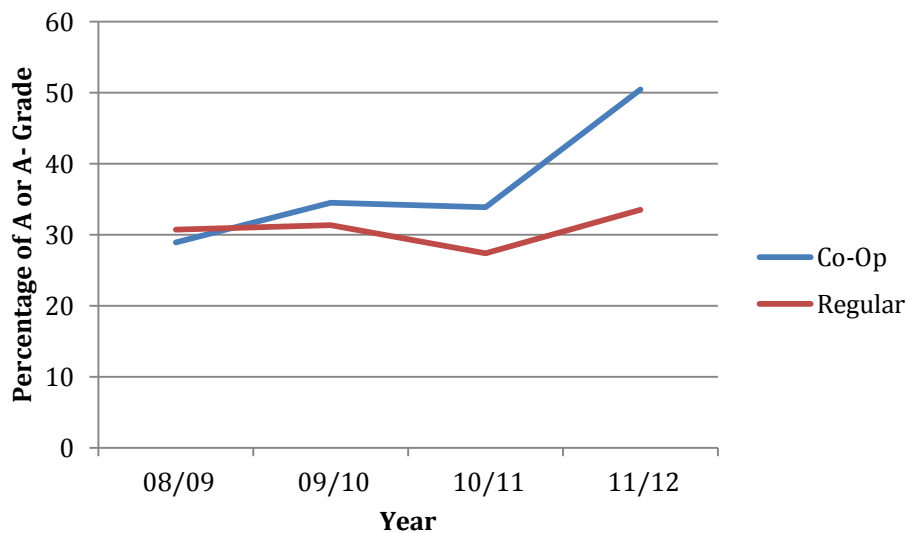


Figure 3: Percentage of A or A- Grade Earned

The benefits of WIL within the CET program are evident with respect to both employability and student success measures. In regards to employability measures, graduates who have chosen the Co-op stream responded more favorable than regular stream graduates to measures: employment rates, return to same employer, and annual median salary. Similarly, Co-op students have shown to achieve higher than regular stream students in key performance indicators such as grad to quota ratios, course completion rates and course grades.

WIL in Construction Management Baccalaureate Programs in Canada

As discussed in the previous sections, WIL is certainly perceived as an essential pedagogy for construction related education. Many research studies have confirmed that overall work placement process was indeed a very worthwhile learning experience and an excellent way of expanding students' knowledge in the construction area (Cocco, 2000; Arain, 2013; Meekel and Jenkins, 2013). This research also looked into recently developed baccalaureate programs in construction management domain in Canada to assess how WIL is addressed in the programs.

Table 1

WIL in Construction Management Baccalaureate Programs in Canada

INSTITUTION	PROGRAM	COURSE	CREDIT	TIME FRAME
<i>British Columbia Institute of Technology</i>	BTech Construction Management	Industry Project	10.5	
<i>Course Description:</i> In conjunction with an industry sponsor, the student solves a technical problem relating to construction. The research project must contain some elements that are innovative, experimental, or exploratory in nature. A department committee will supervise the progress of the project, provide guidance and direction where appropriate, and evaluate the final report and its presentation.				
<i>George Brown College</i>	BATech Construction Science and Management	Co-op Work Term	0	Summer semester (10 weeks)
<i>Course Description:</i> An integral component of this degree in Construction Management is a mandatory co-op work term in the spring/summer of the third year of the program. Our Industry Liaison Office facilitates this for both our students and prospective employers. Students participate in job preparation courses that cover areas such as resume writing, job search strategies and interview practice to enable them to communicate clearly.				
<i>Northern Alberta Institute of Technology</i>	BTech Construction Management (proposed)	Industry Internship	3	Spring/summer semester (4 months)
<i>Course Description:</i> In this internship course of the program, you will work with a construction or construction related company to provide you with exposure to construction-related activities, and management issues. You will be required by the school to prepare daily logs, monthly reports and a final report, signed by your industry supervisor.				
<i>Red River College</i>	BTech Construction Management	Co-op work Experience	27	3-terms (18 months)
<i>Course Description:</i> Co-operative education is an educational strategy that integrates related on-the-job training with classroom theory by way of paid employment during the work term period. Industry demands more than just the technical and academic skills required for graduation. Students graduate with up to 18 months of relevant work experience gained through the co-op ed model of three six-month terms.				
<i>Southern Alberta Institute of Technology</i>	BSc Construction Project Management	Industry Internship	3	Spring/Summer semester (4 months)
<i>Course Description:</i> As part of the <i>Internship</i> of the program, you will work with a construction or construction-related company to provide you with exposure to construction-related activities, and management issues. You will be required by the school to prepare daily logs, monthly reports and a final report,				

As shown in Table 1, there are four institutions offering (proposed offering) baccalaureate degree programs in construction management in Canada. It is interesting to note that all construction management programs include a required industry internship. As part of the industry internship, students gain experience and learn from the practical application of skills and knowledge they have acquired through their studies. The WIL ensures that graduates have the ability to apply the required knowledge and practical experience before entering the industry, enhancing opportunities in the local construction industry.

Construction management baccalaureate programs are designed to provide industry experience through an internship generally after third year of study, to equip graduates with the work-ready skills desired by the construction industry.

Careful consideration has been given to the inclusion of a work experience component to all baccalaureate programs in construction management domain. Considering the nature of the specialty and construction workplace expectations, internship is included in the program structure as an integral component.

Construction management baccalaureate program students would be able, through WIL as common target outcome, to apply essential construction management techniques, to modify performance goals to match evolving workplace requirements, to analyze employer feedback and develop an action plan in response to employer feedback, to apply business and cultural ethics practice within the work environment, and to reflect on placement experience in order to make decisions related to their training, business goals and further educational plans.

WIL component also acts as strong bridge between industry and academia. Several construction companies and stakeholders extend their support for the academic programs especially for industry internships for students during studies. It is also an excellent platform for students to experience the work environment where they would be working upon successful completion on academic programs. For industry, WIL is indeed an effective venue to assess students' competencies and also introduce them to job intricacies that would eventually help young graduates in successfully contributing to industry as they begin their career.

Construction projects are complex because they involve many human and non-human factors and variables. Construction management students learn more effectively where they can get involve in life-cycle of a building project i.e., from conceptual design to completion stage dealing with major issues like resources, cost, quality and time. Project-based learning is an appropriate paradigm for addressing construction project management problems (Arain and Burkle, 2011). Due to the technical expertise required for construction projects, it is integral for learners to go through a practicum environment to understand construction project progress in the industry environment.

Conclusion

There is strong and compelling evidence that Work Integrated Learning embedded within academia curricula has been successful. Active participation through WIL has provided students with beneficial experiential learning experiences in a professional environment in the industry. WIL is an effective pedagogy for transferring technical knowledge and soft skills to young professionals that enhance their employability in the construction industry. A comparative case study on a Civil Engineering Technology Co-op diploma of student success and employability measures underscores the benefits of WIL. Hence, with the increasingly awareness of WIL as an essential pedagogy for education, it is noteworthy that the four construction management baccalaureate programs across Canada has embedded a form of WIL within their curricula. The research findings will be valuable for all academicians and researchers involved in the development of WIL across different levels of construction academic programs

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