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Articulating the learning: professional practice made explicit

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The Diploma of Professional Practice at Central Queensland University has been developed to explicitly prepare students in the Bachelor of Engineering (Cooperative Education) program for their industrial work placement, and then to enable them to articulate the learnings from that placement. The Diploma is a compulsory element of the Cooperative Education program, and awarded as the dual award BEng (Co-op)/Dip Prof Prac Eng at graduation. The Diploma of Professional Practice, equips graduates with the knowledge, skills and attributes needed in professional practice and for professional leadership. The combined program is designed around the triple themes of intellectual, social and professional development. A feature of the professional practice program is its integration with the periods of work placement in a professional environment that provides the opportunity to learn and put into practice, professional practice skills. The existing work placements are highly regarded by employers, and this program provides students with the education to maximize the learning occurring in the professional environment. The program is structured with internal courses delivered before and after work placement periods which provide preparation and review of skills that will be put into practice in the work place, as well as reflection on the learning. The program is a generic program providing students with the necessary professional practice skills to go into the placement and the opportunity to reflect upon their experiences in the workplace. It is through this reflective process that the implicit learning from the work placement becomes explicit assessable learning. (Asia-Pacific Journal of Cooperative Education, 2009, 10(3), 177-188).

KEYWORDS: work-integrated learning, professional practice, preparation, engineering.

One of the aims of a professional degree program is to develop professional skills within its graduates. However, the questions need to be asked. Can professional practice be developed within the university environment? What constitutes professional practice? Is it even the role or responsibility of the university? Employers want their new employees, fresh out of university to "hit the ground running". A traditional university program is a series of courses that when added together create a degree. Yet what is it that binds all the knowledge and experiences together to eventually create a professional? What is it that the university can offer to develop professional practice skills in their graduates? This paper considers those questions through the discussion of the review of an engineering degree. The discussion gives an honest appraisal of where such programs were failing the students, and the resulting unique program that was developed in response to the issues identified.

PROFESSIONAL PRACTICE - PHILOSOPHY AND IMPLEMENTATION

Background

Professional programs such as engineering need to ask the questions identified above when deciding on the philosophy of their program. Central Queensland University (CQU) offers a cooperative education program to engineering students. The cooperative education component is made of two 6 to 8 month work placements which are organized by the faculty. Students who enroll in the program are guaranteed the cooperative placements. The placements are paid placements, and attract a salary of approximately 60% of a graduate salary in the first placement and 75% of a graduate salary in the second placement.

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Employers are partners with the university and the students in the education of the students. Employer partners are eager participants in this process, however, they expect that if they are going to give students a role for that time period, and pay them, they need to be gaining from the experience as well as the student. For that reason, students must be well prepared and ready to hit the ground running. They must have some professional practice skills if they are to be of value. At a global level, the call for changes in engineering programs worldwide has been heard for decades. In the last two decades in Australia there have been a number of reviews of engineering education. Two of these have been supported by the engineering profession and the deans (Institute of Engineers Australia [IEA], 1996; King, 2008). The outcome is that it is well recognized that educators now need to develop graduates with attributes and abilities previously not considered core to their professional practice. As a result there has been an attempt to redefine professional engineering practice (Thom, 1998). International conferences since have called for the development of generic attributes in engineers, which encompass the multi-faceted concepts of engineering practice (Boeing Company & Rensselaer Polytechnic Institute, 1997). Accreditation of engineering programs now depend upon demonstrated development of attributes including effective communication, the ability to work in multi-disciplinary teams, utilization of a systems approach to design, and an understanding of the social, cultural and ethical responsibilities of the professional engineer. Sustainability is becoming the basis of how holistic engineering practice is developed. As the concept of sustainability stands on the three legs of economic, environmental and social sustainability, engineering as a profession, in order to embrace the concept of holistic practice, must first develop an understanding of individual and societal needs (Crofton, 1998). Students need to not only be aware of, but have the opportunity to prepare, practice, and reflect upon these issues.

While much of this discussion was happening, some individual universities were anticipating and addressing the issues. With the aim of better preparing its graduates for the industrial work place of the 21st century, CQU, in Australia, introduced cooperative education into its Bachelor of Engineering program in 1994. The initial introduction was made without any other substantial curriculum changes. The only real pedagogical change was the introduction of distance education to deliver two courses whilst students were on their work placements. The cooperative education component consisted of two nominal six month work placements, one at the beginning of third year and the other in the second half of fourth year. As could be expected, the introduction of cooperative education as discussed in Jorgensen and Howard (2005), achieved only part of the aim. The faculty at the time of approving the program recognized that a complete review of the program would be required to develop the professional of the future. Engineering graduates, to be properly prepared for the workplace still required explicit development of generic skills, such as problem solving, creativity, communication and teamwork.

Faculty Review

A number of the issues relating to the old program are identified in Jorgensen and Howard (2005). A summary of those issues is:

- Program overloaded with technical content (as technology changed, material was simply added to the program, with very little being removed);
- Students were overloaded with excessive class contact hours (29 hours per week in first year)
- High student attrition rates (up to 50% attrition from first year);

- Repeat teaching (surface learning resulted in material being forgotten as soon as the course was passed, and consequently material had to be re-taught when it was next needed); and
- Students were not integrating material.

During the review process it became clear that the traditional CQU (and generally Australian) engineering curricula no longer adequately prepared graduates for professional life. The curricula were still heavily analytical, even though technology had automated many analytical tasks. Self-learning and sustained learning was not strongly encouraged, even though it was an obvious strategy for coping with rapid technological advances. The review process also highlighted fundamental problems with the traditional program structures. These included:

- The promotion of rote or surface learning by excessive course workloads and a reliance on closed book examinations;
- The development of a fragmented knowledge base in traditional course units; students find it extremely difficult to integrate knowledge in a design environment, and have poor problem solving skills; and
- Very poor understanding of professional attitudes and values amongst students.

The faculty identified that a learning environment that reflected the professional workplace and provided a meaningful context in which the fundamentals of technology and design could be studied, was required. Through a review of international teaching and learning in engineering, and the outcomes of a National Teaching Grant, problem-centered or project-based curricula were identified as providing the best solution. The bulk of the international education literature had for at least 20 years, agreed that project-based learning had the following advantages:

- It takes account of the way in which students learn, the learning style is active, deep and contextual;
- Enormous improvements in student motivation have occurred elsewhere; first year attrition rates can be as low as a few percent;
- It develops a high level of generic and self learning skills;
- It supports the integrated view that most engineers have of their profession; and
- Project-based learning produces highly valued engineers in the industrial setting.

The outcome of the faculty review was the proposal for significant curriculum and pedagogical changes. The review conducted in 1995/6 resulted in the development in 1997 of a Project Based Learning (PBL) philosophy incorporating a partially inverted curriculum, to complement and enhance the co-operative education model already in place. The PBL/Cooperative education Bachelor of Engineering program commenced operation in 1998.

In addition to the PBL approach to teaching, the faculty had delivered professional practice skills training, specifically designed to support the students in their co-op placements. The placements then gave the opportunity to work in industry where they could use and develop these skills. Upon their return to the academic environment, they were encouraged through reporting requirements for their work placement, to reflect upon how those issues had impacted their placement. These learning opportunities however were not formally recognized by the University (except in the assessment of the work placement report) and were not credited towards their degree. This lack of recognition and credit was the motivation for the development of a professional practice program. This program replaced and extended material previously provided in the work placement courses of the engineering co-op program.

Engineering Professional Practice

The Diploma of Professional Practice, integrated with the Project Based Learning (PBL) Bachelor of Engineering (Cooperative Education), aims to explicitly equip graduates with the knowledge, skills and attributes needed in professional practice and for professional leadership. The combined program is designed around the triple themes of intellectual, social and professional development (James Goldston Faculty of Engineering & Physical Systems [JGFEPS], 2004a).

The Diploma of Professional Practice program is a generic program designed to provide students with the necessary professional practice skills to go into the work placement and the opportunity to reflect upon their experiences in the workplace. It is through this reflective process that the implicit learning from the work placement becomes explicit, assessable learning. Graduates of this dual award program have demonstrated the knowledge, skills and attitudes needed for professional engineering practice and leadership. This encompasses academic knowledge and skills with engineering discipline theory, technical expertise, personal development and professional formation. In particular, this program enables specific and measurable development of professional engineering practice skills, employment readiness, social awareness and lifelong learning attributes. A feature of the professional practice program is its incorporation with the periods of work placement in a professional environment that provides the opportunity to learn and put into practice, professional practice skills. The existing work placements are highly regarded by employers, and this program provides students with the training and education to maximize the learning occurring in the professional environment. The program is structured with internal courses delivered before and after work placement periods to provide necessary preparation and review of skills, which are then put into practice in the work place. They also require reflection on the learning.

The new program separates the professional development components previously combined with the BEng(Co-op) work placement courses and presents them in an explicit program. This explicit program provides students with due recognition of their professional practice skills. This program is now integrated with the BEng(Co-op) program to form a dual award program known as Bachelor of Engineering (Co-op)/Diploma of Professional Practice (BEng(Co-op)/DipProfPrac(Eng)). With the introduction of this dual award, the BEng(Co-op) is no longer offered as a standalone program.

The Dual Award

In 2005 the BEng(Co-op) was replaced by the new integrated dual award program, named the Bachelor of Engineering (Co-op)/Diploma of Professional Practice (Engineering). The new structure is shown in Table 1.

Whilst this appears to be an increased load for students, as to some extent it is, it formally recognizes additional learning that students were, to a large extent, already undertaking previously in preparation for, and reflection after completion, of their work placements.

Professional Practice Program Structure

The structure of the Diploma of Professional Practice program element of the dual award program is as shown in Table 2 and thus details the content areas of the courses that are part of the Diploma of Professional Practice component of the dual award.

TABLE 1
Bachelor of Engineering (Co-op)/Diploma of Professional Practice (Engineering) program structure (post-June 2004)

Year	Term 1	Term 2
	Lecture Based Course	Lecture Based Course
1	Lecture Based Course	Lecture Based Course
	Project Based Course	Project Based Course
	Lecture Based Course	Lecture Based Course
	Lecture Based Course	Lecture Based Course
2	Project Based Course	Professional Practice Course
		Project Based Course
	Work Experience – Industry	Lecture Based Course
	Placement	Lecture Based Course
3	External Study Course	Professional Practice Course
		Project Based Course
	Lecture Based Course	
	Lecture Based Course	Work Experience – Industry
4	Professional Practice Course	Placement
	Project Based Course	External Study Course
	Lecture Based Course	
	Lecture Based Course	
5	Professional Practice Course	Graduation
	Project Based Course	

TABLE 2
Professional practice element of the cooperative education engineering program

Course	Units of Credit	Comments
Professional Practice Preparation 1 (PPP1)	6	Covers resume writing, interview skills, ethics, health and safety, industrial relations– prior to 1st work experience
Professional Practice Review 1 (PPR1)	6	Covers documentation of actual work experience using competency framework, formal presentation of work experiences, shared reflection workshops.– following 1st work experience
Professional Practice Preparation 2 (PPP2)	6	Covers additional engineering workplace skills similar to first line supervisors course.– prior to 2nd work experience
Professional Practice Review 2 (PPR2)	6	Covers documentation of actual work experience using competency framework, formal presentation of work experiences, shared reflection workshops.– following 2nd work experience
Work Experience 1 (WE1)	6	Formal course structure to match work experience period.
Work Experience 2 (WE2)	6	Each course of nominal 12 weeks duration. Assessment
Work Experience 3 (WE3)	6	limited to weekly activity and reflection journals and self-
Work Experience 4 (WE4)	6	established job objectives.

Implementation

The Diploma of Professional Practice program was developed to separately formulate, recognize and extend the professional development components previously implicitly combined with the work placement courses and presents them in an explicit program. The program is a generic program designed to provide students with the necessary professional

practice skills to go into the placement and the opportunity to reflect upon their experiences in the workplace. It is through this reflective process that the implicit learning from the work placement becomes explicit assessable learning. Graduates of this dual award program have demonstrated the knowledge, skills and attitudes needed for professional engineering practice and leadership. This encompasses academic knowledge and skills with engineering discipline theory, technical expertise, personal development and professional formation. In particular this program enables specific and measurable development of professional engineering practice skills, employment readiness, social awareness and lifelong learning attributes (James Goldston Faculty of Engineering and Physical Systems [JGFEPS], 2004b). This program is similar to one offered at the University of Technology, Sydney (UTS), called a Diploma of Engineering Practice. (University of Technology, Sydney, 2005). This means there are now two engineering faculties in Australia offering a dual award incorporating cooperative education and professional practice. This is evidence that there is an increasing perception amongst industry and educators that the professional practice skills require explicit development and recognition.

The Courses

The preparation courses are team taught by a range of staff. The content relating to getting a job and career management is taught by engineering academic staff and staff from the Student Services Division. The team teaching is important, as while the Student Services Division staff have knowledge of the content area, the engineers can add the context that is critical. Other lectures are delivered by industry guest lecturers to ensure that the students are exposed to the current industry perceptions. The review courses are taught by engineering staff. The staff have been a combination of academics and industry guests.

Professional Practice Preparation 1

Professional Practice Preparation 1 is designed to prepare the second year students for their first work placement. These students have two years of technical study, but need to be "work ready". The faculty recognized that if the students are in the workplace for only 6 to 8 months, then they need to be of value to the employer from the start. In the same way that the technical study had been specifically chosen to ensure that they were capable of performing worthwhile engineering work, the professional practice course was designed to ensure that they were not lost in a professional environment. The course covers:

- Resume and letter writing skills;
- Responding to selection criteria;
- Interview techniques;
- The transition from study to work;
- Employment contracts and conditions;
- Developing career management skills through identifying the industry and types of employer they hope to be involved with as an engineering practitioner;
- How to evaluate their own work in terms of the Engineers Australia National Competencies; and
- Critical engineering workplace issues including ethics, codes of conduct and OHS.

The students learn specific skills such as how to apply for a job, and how to get the job that they want. This is done through attendance at classes to address the content, and then having to apply for their cooperative education positions. The cooperative education positions are in reality their first job in their new profession of engineering. As such it is

important that the students recognize that they are starting to make career management decisions when they apply for positions.

Particularly for students who have come to the university as school leavers, as opposed to mature aged entry, the students need to have an understanding of why they are selecting the positions they are applying for. As a job is only one aspect in the life of a student or graduate, the students are encouraged to reflect upon what they want to achieve in their lives and what is important to them. The course includes discussions on why they would select a particular position. Potential reasons could include:

- Location of the position;
- Employment conditions;
- The type of industry;
- Type of employer; and
- Reason for placement:
  - Try this type of industry;
  - Obtain skills that are required for desired graduate position; and
  - Determine if this is the type of role they would like on graduation.

Students are asked to research the type of industry and employer that they would like to work for, and reflect on why their choices are important to them. Reflective practice allows the students to articulate their choices, and be confident in their choices, rather than simply following the majority rule in the cohort, and for example, selecting the highest paying employer. This increases the satisfaction level of the placement for both students and employers.

Additionally the students attend the presentations given by the third year students who have just returned from their work placement. These presentations allow the students to hear what the actual placements were like. What the students gained from the experience? What was the role that they performed? What projects were they involved in? What were the conditions? What were the issues? How did they deal with the issues? As the faculty is responsible for ensuring that there are sufficient positions for all students enrolled in the cooperative education program, through the course website, the list of available positions is made available to the students. The students then apply for the positions that they are interested in, in the same way that they will upon graduation. Employers receive the applications from the faculty, which consist of an application letter, resume and selection criteria. The employers then notify the faculty which students they wish to interview, and the faculty organizes an interview schedule for the students and employers. Following the interviews, both the students and employers supply the faculty with their list of preferences – the students with their preferred employers, and the employers with their preferred students. The faculty then attempts to match students with employers in the best fit based on the preferences.

Assessment of the course is criterion based. Rather than add up a series of scores from a range of assessment items, the faculty has prioritized the outcomes of the course, and allocated grade to the level of professional practice. A pass grade is based on the quality of documents that they develop for their application, and the feedback on their interview Higher grades require students to effectively reflect and articulate their career goals and be able to address the requirements for professional practice from the professional body, Engineers Australia, by writing career episode reports based on case studies.

Professional Practice Review 1

Professional Practice Review 1 is designed to have the students reflect on their first placement. The cooperative education placement they have just completed has in the majority of cases been a stimulating and motivating experience. This in itself is good, but the experience on its own does not necessarily result in learning. For true learning to occur, the students must use reflective practice and articulate their learning. There is a certain amount of learning that then does occur through the reflective process, but this in turn can be highlighted through the process of collaborative learning. The students, by sharing their learning and experiences can compare and contrast, and use each other's stories as a catalyst for their own further learning.

The presentation of this course is done entirely by the students. Their course of study requires them to present their placement outcomes and learning to their peers in an oral presentation. At the end of each session, the course facilitator (otherwise known as a lecturer) leads a discussion on the commonalities and differences in the placements, and deals with any major professional practice issues that have arisen from the presentations. Within their presentation, the students must describe their company, their department and their employment conditions. They must also give a description of the work that they did, what projects they were involved in and how the work was achieved. They are asked to reflect on their competence in the position. They must then reflect upon what was achieved by the work, and identify what contribution they made to the company, and the significance and value of the experience to themselves, as well as any specific learning. They must identify what the company achieved by employing them as a co-operative education student, and this is not just that certain projects were finished, but what did the company learn? They must do a self evaluation of their personal growth in the areas of intellectual, social and professional growth. This is not just identifying their growth, but articulating the change in themselves, that demonstrates that the growth has occurred. Finally, they must articulate and analyze the workplace issues that they had to deal with.

As part of demonstrating that they are addressing professional growth, they are asked to write a career episode report. This is a document that will form part of their engineering practice portfolio for application to become a Chartered Professional Engineer (CPEng). It addresses the ongoing professional practice development requirements of the professional body. The document requires that they document their achievements, and provide evidence as to how that achievement has met the criteria for professional practice as required by the professional body. While it is not expected that at this early stage their experiences will provide sufficient depth to allow them to claim the experience for professional accreditation, it is requiring the students to act in a manner, and document their experiences as a professional would. Once again the assessment is criterion based.

Professional Practice Preparation 2

Professional Practice Preparation 2 is taken by the fourth year students, preparing them for their second work placement, and aim to extend the learning started in Professional Practice Preparation 1. It has the students investigate:

- Their skills and attributes;
- Professional responsibility;
- Career exploration;
- Career management;

- Further interview skills; and
- Further review of Engineers Australia National Competencies for CPEng.

In this course the skills developed for applying for a position are extended. The students are expected to use the outcomes of their application and interviews from PPP1 to improve on their applications. Emphasis is put on the students having a good understanding of why they are applying for this position. Now they are looking for different attributes in a job: In addition to all the attributes identified for the first placement, students are asking:

- How will it extend their knowledge;
- How will it prepare them for their desired graduate position;
- Confirmation that this is the right type of industry;
- Confirmation that this is the right type of employer; and
- Can this employer provide an industry based thesis project.

The feedback from employers in the last two rounds of interviews has said that these students are the best prepared for interview of any they have ever interviewed. The students are taking a proactive role in the interview, and very conscious of what they want to achieve with their cooperative education position. The interviewers felt that they were being interviewed as much as they were interviewing, which impressed them. They were able to attempt to "sell" their company and position, and had potential employees who were aware of the company and industry, and were ready to start.

The students were confident in the interviews, not only because they knew what to expect, and what they wanted to achieve, but also because the course required them to identify their skills and attributes. The course once again was a combination of content and reflection. Once again the students attend the presentations by the fifth year students returning from their second work placement. This allowed them to see how the second cooperative education placement was different to the first, what types of roles could be taken by student engineers who were one term off graduating. This was very different to the first placement, where the jobs were mainly assisting other engineers. As the students had only three courses to complete (including finalizing their thesis project) prior to graduation, they were taking on the role of a graduate engineer. Many students were managing entire projects. The realization of how different the positions were was very important to the students about to embark on this final placement. Listening to the stories of the placements and hearing of how students dealt with the issues that arose, and articulating how this applied to them was part of their learning.

Professional Practice Review 2

Professional Practice Review 2 follows the same format as Professional Practice Review 1. The students reflect on their work placement and present their reflections to the class. This time, however, the students are expected to reflect at a deeper level. The students at this point are a matter of weeks away from finishing their program of study and graduating. They are required to reflect upon their experiences at graduate level. The vast majority of the students have in fact been treated as graduates during their placement. Many of them held positions with the title "Graduate Engineer". Their reflections at this level are really around how they interact with a wide range of colleagues, clients and stakeholders. Their professional practice has typically been team based, and required them to use professional skills of communication, creativity, problem solving, prioritizing while working on multiple projects simultaneously and reacting to time constrained problems.

The issues that they have had to deal with are much more related to their professional practice in this placement than the last. Many have had to deal with ethical and community considerations, as they were placed in decision making positions. Their response is usually more grounded in reality, and determining a real solution rather than believing that they need to rely on others to help them when they are in a bind. This sharing of reflections allows the students to compare their experiences and identify common issues and share solutions that they have developed to those issues. The commonality of many of the issues allows them to realize that professional practice requires them to find solutions to issues. Their issues are not unique, and they are part of being a professional. While they may have high ideals, it offers comfort that they are not alone, and the sharing (communication) is one potential process for determining solutions.

Additionally the students are asked to reflect on their career planning process, and to evaluate their ability to function in their chosen career. Having finished two cooperative education placements, they must consider if the placements have aided in determining their career directions. Many have been offered full time positions at the end of their second placement. For some that option is taken, and they are happy to take it as they have identified that the environment is where they choose to work. Some identify that while they enjoyed the experience, they do not wish to work for that company or within that industry long term. All are clear about what they want to achieve with their next position. The students are all required to write a final career episode report based on their last placement. It has been interesting to note that the need to meet this requirement has made many of the students very aware of graduate programs within individual employers. For many students, the ability to participate in such as graduate program is becoming a major factor in their decision making about what type of employer they wish to work for. The assessment is once again criterion based and revolves around their identification and demonstration of how they have met the learning outcomes.

DISCUSSION

So has the program addressed the original issues raised over a decade ago? Considering the points noted from the review, the program is effectively dealing with those issues. The program is no longer overloaded with technical content. Accreditation of engineering programs occurs every five years, and so two accreditation rounds on, the professional body is satisfied with the content. Staff are now conscious of the currency of technical material, and the project based courses ensure that only content that is relevant is part of the courses. Students now have a nominal 16 hours per week class contact time – with a maximum of 20 hours per week when in the diploma of professional practice. This allows more time for individual and collaborative learning experiences. The repeat teaching is no longer needed, as students are learning as they need the material. The lifelong learning skills that are being developed in the PBL courses are helping students to automatically look for the information themselves if they have forgotten it. They comment continually in their reflections in the review courses that the skills that they learn in PBL courses makes them confident to work in projects and on problems where they do not have all the information, because they have the skills to learn them independently. The attrition rate is now down to a consistent 15% at the end of first year with most students who start second year following through to graduation. The integration of the course material within the PBL courses, as well as the cooperative work experiences where they have no choice but to integrate has developed students who do not learn content in isolation. One of the greatest improvements is in the students is their

understanding of professional attitudes and values. The improvement from year one is evident in their reflective journals, as well as their demonstrated approach to their clients in their PBL projects and their employers and colleagues in the workplace. Their approach to staff is now as junior engineers rather than students. That is the language that they use on return from co-operative education placements. They now consider themselves as professionals rather than students.

WHERE TO NOW?

In 2008, the faculty introduced the Bachelor of Engineering program in distance or flex mode. While the cooperative education version of the program is only offered internally, mainly because the Diploma of Professional Practice is only offered internally, there is already pressure to offer it in distance mode. The typical distance student is already situated in industry, and consequently the advantages offered by cooperative education are not so valid. However, for those students who are offered the opportunity to remain with their final co-operative education employer after the conclusion of the placement, the opportunity to study in distance mode is needed. The challenge now becomes being able to deliver a course that requires classroom participation of the students, in the sharing and discussion of the issues arising, in a distance mode. While that challenge can be overcome with the use of online learning management systems, a further challenge looms. As the courses are so based on reflection, can true reflection on a culture occur while the individual is still immersed in that culture? Or will the fact that they are still working within the culture taint the quality of the reflection?

CONCLUSION

The development of this program had its origins in a review which identified significant issues to be addressed if the program were to produce professionals ready to work, without sacrificing 50% of the cohort to attrition along the way. The resulting program has met the original objectives, and now develops graduates that have demonstrated professional practice skills and a professional attitude. The attrition rate has been reduced to approximately 15%, with 16-20 hours per week contact hours. The use of a PBL philosophy has created graduates who are confident to approach new problems and new learning experiences as they have independent learning skills. They do not use their lecturers as crutches for their learning. The inclusion of cooperative education has provided them with the opportunity to practice their professional skills and the result is that they return to the university with the attitude that they are junior professionals, rather than students. It is well recognized that cooperative education is capable of informing, and even enhancing the development of a graduate's generic skills. While this can even be achieved from exposure to the work place, incorporating and integrating explicit professional practice skills development, enables a significant internalization of professional practice. This professional practice includes generic and technical knowledge, skills and attitudes. The internalization occurs through identifiable preparation for, application in, and considered reflection of, learning experiences. The reflective process enables the articulation of learning from the experience. CQU has developed an integrated Bachelor of Engineering program, incorporating cooperative education and specific development and recognition of professional practice skills, through the Diploma of Professional Practice. This program is believed to be unique in the world with its interpretation and combination of these learning paradigms. It has taken 14 years of development within the university to reach this stage

with parallel developments nationally and internationally informing and shaping its structure. Whilst a significant achievement in its own right, the program as it now stands, should be considered as a staged step in the engineering program's development continuum.

REFERENCES

Boeing Company & Rensselaer Polytechnic Institute. (1997, January 22-23). A manifesto for global engineering education. Summary report of the Engineering Futures Conference. Seattle, WA: Boeing.

Crofton, F. (1998, September). Sustainable development and engineering. Keynote Address at the 10th Australasian Conference on Engineering Education. Gladstone, Australia.

Institute of Engineers Australia. (1996). Changing the culture: Engineering Education into the Future. Canberra: IEA.

James Goldston Faculty of Engineering & Physical Systems. (2004a). Business plan: Diploma of Professional Practice. Rockhampton, Australia: JGFEPS, Central Queensland University.

James Goldston Faculty of Engineering & Physical Systems. (2004b). Program proposal: Bachelor of Engineering (Co-op)/Diploma of Professional Practice. Rockhampton, Australia: JGFEPS, Central Queensland University.

Jorgensen D., & Howard, P. (2005, June). Ten years in the making: A unique program in engineering. Paper presented at the 14th World Conference on Cooperative Education. Boston, MA.

King R. (2008). Engineers for the future. Surry Hills, Australia: Australian Council of Engineering Deans, Australia.

Thom, D. (1998). Engineering education and the new industrial revolution. International Journal of Engineering Education, 14(2), 89-94.

University of Technology, Sydney. (2005). Retrieved 29 March, 2005 from http://www.eng.uts.edu.au/ProspectiveStudents/undergraduate/bachelorofengineering.htm#STRUCTURE

ABOUT THE JOURNAL

The Asia-Pacific Journal of Cooperative education (APJCE) arose from a desire to produce an international forum for discussion of cooperative education issues for practitioners in the Asia-Pacific region and is intended to provide a mechanism for the dissemination of research, best practice and innovation in work-integrated learning. The journal maintains close links to the biennial Asia-Pacific regional conferences conducted by the World Association for Cooperative Education. In recognition of international trends in information technology, APJCE is produced solely in electronic form. Published papers are available as PDF files from the website, and manuscript submission, reviewing and publication is electronically based.

Cooperative education in the journal is taken to be work-based learning in which the time spent in the workplace forms an integrated part of an academic program of study. Essentially, cooperative education is a partnership between education and work, in which enhancement of student learning is a key outcome. More specifically, cooperative education can be described as a strategy of applied learning which is a structured program, developed and supervised either by an educational institution in collaboration with an employer or industry grouping, or by an employer or industry grouping in collaboration with an educational institution. An essential feature is that relevant, productive work is conducted as an integral part of a student's regular program, and the final assessment contains a work-based component. Cooperative education programs are commonly highly structured and possess formal (academic and employer) supervision and assessment. The work is productive, in that the student undertakes meaningful work that has economic value or definable benefit to the employer. The work should have clear linkages with, or add to, the knowledge and skill base of the academic program.

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The editorial board welcomes contributions from authors with an interest in cooperative education. Manuscripts should comprise reports of relevant research, or essays that discuss innovative programs, reviews of literature, or other matters of interest to researchers or practitioners. Manuscripts should be written in a formal, scholarly manner and avoid the use of sexist or other terminology that reinforces stereotypes. The excessive use of abbreviations and acronyms should be avoided. All manuscripts are reviewed by two members of the editorial board. APJCE is produced in web-only form and published articles are available as PDF files accessible from the website http://www.apjce.org.

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