Acknowledging the educational and professional value of voluntary service experiences

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ABSTRACT: The Faculty of Engineering at UTS recognises the need for engineers to communicate technical issues to non-engineers and interact more effectively with the community about social needs and technological impacts and risks. Engineers are also often required to share their design and specialist expertise with community members and educators to better inform decisions and curriculum directions. To do these things effectively engineers must learn more about the non-engineering consequences of their solutions. To this end the Faculty of Engineering at UTS has developed an elective subject called ‘Professional Service Project’. Two key outcomes of this subject are that the links established between the university, engineering and the community develop a better understanding of the needs of each stakeholder; and the subject recognises and rewards the skills learned through voluntary service. We outline how this subject is managed and expand on some of the activities involved.

INTRODUCTION

Staff and students in the Faculty of Engineering at UTS have long been involved in voluntary service projects, contributing their time and expertise for rewards counted in personal fulfilment. Examples of projects include working with voluntary organisations on engineering presentations and activities, or speaking to prospective students about engineering. To staff working with student volunteers it quickly becomes obvious that the students not only enjoy the tasks but learn skills that are often difficult to teach in a more formal setting.

After discussing these observations the Faculty of Engineering at UTS decided they needed to

- reward the skills learned by students during voluntary service
- find a practice-base for teaching the voluntary service skills expected of professionals
- equate these skills learnt with the professional approach needed by engineers, especially skills in communication, co-operation and management
- promote the new Bachelor of Engineering Diploma of Engineering Practice ‘sandwich degree’ as one that values and addresses the community issues confronting the engineering profession
- balance the diminishing staff resources with requests for staff involvement in service projects
- keep staff and students in contact with current trends and issues facing school educators and the community at large
- encourage students to work with staff as colleagues in their learning.

Voluntary service work requires a different range of skills from those normally developed in traditional engineering courses. It also needs an understanding of the issues important to sections of the community not directly associated with industry or the university. One way for students to gain these skills and understand the issues is for them to become involved in voluntary service work.

To this end the Faculty of Engineering at UTS has developed an elective subject called ‘UTS Professional Service Project’. Two key outcomes of this subject are that

- the links established between the university, engineering and the community through the subject develop a better understanding of the needs of each stakeholder
- the subject recognises and rewards the skills learned by involvement in community service.
PROFESSIONAL SERVICE PROJECT

Professional Service Project is available to students at any stage of their engineering course. Its major aims are to develop in students an appreciation of the service obligations, personal development opportunities and other non-financial rewards associated with working as a professional engineer. It provides an innovative opportunity for engineering students to be involved in voluntary service projects.

UTS has always valued work experience as an integral part of learning to be an engineer. Professional Service Project is a subject within our ‘practice-based’ course that values voluntary community service as a learning experience for effective engineering. The subject allows students to participate in one or more professional service activities. Each activity helps to build a better understanding of the culture of engineering and the current debates surrounding it. Students analyse the impact of the activity on the recipient organisation and evaluate the competence they need to be able to perform the service in a manner consistent with the code of ethics. [1]

In many cases students work with professionals from non-engineering disciplines. This increases their awareness of an engineer’s interdependence with others and develops their communication skills as engineers with non-engineers. It also allows students to gain a better understanding of the role engineering plays in society and, in particular, the perceptions that the community at large have about engineering.

Personal Development

The subject assists students in developing a sense of personal and professional responsibility by providing an opportunity for
- recognising the value of critical reflection in their personal, academic and professional life
- gaining insights into social and political aspects of community life
- interacting with staff as colleagues rather than simply teacher-learner
- improving their understanding of the importance of, and skill in advocacy to, community groups
- experiencing the non-financial rewards associated with volunteer work
- developing their ‘people’ and communication skills and gaining an understanding of their own progress towards development as a professional engineer.

SOME OF THE ACTIVITIES

1. Broadcast2000

The Sydney Olympics Broadcast Organisation (SOBO) is the host broadcaster for all Olympic events. About 200 UTS engineering students will be trained as Commentary Control Room Operators and work in this position during the 2000 Olympics. Two major outcomes of participation in this unique event will be that students will
- appreciate the role of engineering in major world sporting and cultural events
- experience the need for ethical and competent practice.

The subject requirements include technical training in broadcast technology and investigations into Olympic-related issues. Work at the Olympics will be followed by an opportunity for reflection and reporting before the requirements of the subject are completed. [2]

2. Orientation Camp

Since 1992 the Faculty has run an orientation camp for students entering the engineering degree program directly from the HSC. Current students ranging from second year to those almost finished their course make a key contribution to the camp. They volunteer their time to work with staff to ensure that each camp is a success by
- supervising activities with staff and on their own
- providing an informal source of course information that has more credibility from ‘near peers’
- demonstrating the thesis projects of later stage students
- managing recreational activities
- acting as excellent gophers.

The student volunteers genuinely enjoy attending the camp and we have never had trouble obtaining enough volunteers. Staff had observed the personal development of the volunteers and felt that it warranted recognition. Professional Service Project provides that recognition. Interestingly, however, not all volunteers intended
to collect the reward points, preferring instead to save their electives for technical subjects. Enjoyment and personal satisfaction were reward enough. [3]

3. APACE (Appropriate Technology for Community and Environment Inc.)

APACE designs and installs appropriate technology and renewable energy options for isolated communities. Student volunteers were needed to redesign the micro-hydro power generation laboratory as a presentation space about the project. Students are trained as presenters to first year engineering students and to school students and other groups visiting the university. [4]

4. Faculty Promotional Activities

There are many opportunities during the year for student volunteers to become involved in the promotional activities of the Faculty. Open days, careers markets and presenting career talks at schools are some of these opportunities. As with the orientation camp, there are messages and experiences that can only be communicated effectively by current students. There are opportunities for students to describe their work experiences overseas and in Australia as well as their impressions of the course. These and other promotional exercises develop the communication skills of the students and allow sharing of experiences with others. Students can be involved in a number of these opportunities and use them to develop a balanced portfolio of projects to complete the subject.

5. EngineeringLinks

EngineeringLinks was developed to address the lack of understanding in the community (especially in schools) about engineering and the role of engineers. Initially it was thought that a kit was a solution to the problem. However, after research into available kits and similar resources and their current use the outcome was changed to a volunteer activity [5-11]

This activity links UTS students with educators and community group leaders to work together to

- organise an engineering event or challenge
- develop a unit of work for a class
- talk to a class on an engineering topic
- find information and resources for a teaching program
- engage students in hands-on engineering experiences
- develop web-based resources to support teaching programs.

The EngineeringLinks activity recognises that such a service can meet the needs of engineers, educators, and school students.

Engineers need

- communicate technical issues with non-engineers and interact more effectively with the community about social needs and technological impacts and risks
- share their design and specialist expertise with community members and educators to better inform decisions and curriculum directions
- learn more about the non-engineering consequences of their solutions.

Educators need

- user-friendly sources of knowledge in fields of their teaching subjects related to engineering
- an understanding of the importance of engineering to their teaching subjects
- help and resources for their technology education programs.

School students need

- to determine their future
- to hear the advice of those who have recently made their career choice (their near-peers).

Engineering students are appropriate people to meet such needs as they have:

- experience in design and problem solving
- knowledge and skills in systems, materials, techniques and energy processes related to their field of engineering practice
- access to information and resources useful to technology educators
- the need to develop communication skills important for engineers
- better rapport with high school students than older academic staff.

IEAust has also addressed many of these needs through their Neighbourhood Engineer program. Through this program practising engineers are linked with schools to provide such a service. [12]. By being trained and practised through the
EngineeringLinks project, student engineers will be more readily able to take on this role when they become part of the engineering workforce. Links have also been made between the EngineeringLinks project and the Education and Training Executive of IEAust.

Engineering students enrolled in the EngineeringLinks activity at UTS are trained in presentation skills and school curriculum needs to support educators in classroom activities linked to engineers and engineering.

**Some links that have been made**

1. Elizabeth (Mechanical Engineering final year student) was linked with Penni (Primary School teacher of Year 6) to work with the class who were designing a fun park. Concepts of friction, gravity, energy, structures and motion were dealt with by Elizabeth and supported through Penni’s management of the design project. Reflective journals, practical design activities, design process practice and fun were all part of the class project.

   Outcome - these young students now use the words ‘engineering’, ‘friction’ etc as part of their everyday vocabulary.

2. Swantje (Mechanical Engineering mid course) was linked with Debbie (Senior High School physics teacher) to provide engineering challenges to support activities for a Year 11 physics camp. Swantje did this by working with a team of 5 other student volunteers.

   Outcome - still to come

3. Karen (Civil/Environmental Engineering final year) was linked with Stephen (Secondary Design and Technology teacher of Year 9) to act as mentor for small groups within his class who were designing an item for sustainable living.

   Outcome - Karen found that she needed to do more research to better support her students in this venture. Subsequent visits enabled her to use her research to support the design activity.

4. The NSW HSC subject Engineering Science has recently had major syllabus changes. In the year 2000 these changes will be implemented under the new subject name ‘Engineering Studies’. Students are currently being linked to appropriate staff from the faculty to produce resources for teachers in new areas of this syllabus.

   Outcome - Teachers faced with implementing new units of work next year will have reference materials and suggested activities presented to them in workshop format later this year. This will enable them to understand more fully the facts and issues surrounding these new syllabus requirements.

**MANAGING THE SUBJECT**

Professional Service Project is managed by a subject co-ordinator who liaises with the co-ordinators of the various community service activities involved. For an activity to be included in the subject it must involve the student in voluntary community work that is about engineering but may not necessarily be traditional engineering work.

Before formal enrolment in the subject itself, students are able to volunteer for registered service activities. To meet the requirements of this subject each activity must have a co-ordinator, a learning contract and a value as measured in professional service points (PSP’s). One PSP is equivalent to one hour of preparation, service, reflection and documentation of the activity. This includes time allowed for preparation and training, the work itself, writing the reflection and reporting on the work.

Each activity co-ordinator negotiates with the subject co-ordinator about the academic requirements of their activity, whether it best suits a pass/fail or graded mode and what fraction of the total requirement for the subject it fulfils.

On completion of each activity, students are issued with a certificate confirming the PSP’s awarded and outlining the type of service work they have done.

Students can enrol in a 2-, 4-, or 6-credit point option of the subject. These options have corresponding PSP requirements (25, 50 and 75 respectively). The remaining 50 hours normally required of a 6-credit point subject are used for a small number of lectures and the formal assessment requirements.
When students actually enrol they can use previously earned Professional Service Project certificates towards the required service work. While formally enrolled students can also be involved in one or more significant professional service activities. Each of these will also have associated with it a co-ordinator, a learning contract and a value as measured in PSP’s. Students involved in multiple activities are encouraged to develop a balanced portfolio of service activities to meet the subject requirements. For this reason restrictions are placed on how many PSP’s can be earned by repeating the same service activity.

The learning contract for each activity specifies the skill level to be reached before undertaking the activity, how the training is to be provided, the task itself, the educational aims of the activity and the nature of the documentation and reflection that is to take place at the end of the task.

The final assessment of the subject requires students to submit a written report and reflection on all the activities making up their required PSPs and to give an oral presentation of this report.

**JOYS AND PITFALLS**

The subject provides incentives for students to become involved in community service activities. It demonstrates that UTS values the educational outcomes of such involvement. But by giving credit point reward is this undermining the concept of voluntary service?

Despite the opportunity provided by Professional Service Project for ‘reward’ for service, many students still volunteer to help with projects with no intention of ever claiming their ‘payment’ except in the form of a certificate that says ‘well done!’.

The success of many of the activities relies on the impression students give of UTS and the Faculty of Engineering to their clients and potential students. It is paramount that students who see this subject as an easy way to earn 6 credit points have the opportunity to develop the communication, co-operation, practical and management skills required before they undertake the service activity. Many of these skills are also seen as important for practising engineers and are listed in the IEAust key competencies [13]. The subject must therefore include briefing, participation and debriefing components to ensure that the needs of all the stakeholders are met. [14]

The management and co-ordination of the project is a 4- or 5-dimensional task. Sometimes it is as simple as being given an activity, finding volunteer students and support staff, then working through the activity. However, more often it is a task of juggling time, activity requirements, suitability of students and staff, resources and the ‘image’ of UTS engineering. Hopefully the juggler does not drop the balls too often. Effective co-ordination of the subject involves complex networking skills.

Equity in assessment is another juggling act for the co-ordinator. PSPs (Professional Service Points) are a ‘currency’ giving value to the variety of tasks needed for a variety of activities to acquire a variety of skills. While one student may undertake the whole project, others may be part of a team to achieve the whole. But is time spent compiling an address list and mailing promotional material equivalent to time spent preparing and presenting the talk being promoted? Without either part of the activity the activity could not happen! Learning contracts are used to ensure equity in assessment.

**CONCLUSION**

Despite the bugs that are still to be ironed out of the management of Professional Service Project and the lack of resources (especially staff time and money), we are convinced that we have a fair and equitable solution to meeting the needs of engineering students, educators (both at UTS and in schools) and the community.

The positive outcomes that can be demonstrated are that:

- the links already established between the university (staff and students), engineering and the community through the subject have developed a better understanding of the needs of each stakeholder.
- the skills acquired by community service are being recognised and rewarded.

All activities currently run within the umbrella of Professional Service Project are co-ordinated by staff from the Faculty of Engineering at UTS. Once we are comfortable with the management strategies for these we will investigate
opportunities for extending Professional Service Project activities to valuable volunteer activities wholly based in the community. These will be driven by community needs, rather than university needs and policies, and initiated by interested and motivated students.

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