A *Seminar* within a Subject Hones Communication Skills*

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Recent commentaries on Australian higher education note that employers are looking for graduates with more than mere subject competence, they require people who are also analytical, creative thinkers, attuned to the need for life-long learning, flexible, good communicators and sensitive to social contexts. In short, employers are looking for graduates who are *educated* rather than just *trained*. By the time the students take the *Computers in Society* subject, they are looking to enhance their employability by developing their own communication skills. Up to this point many had viewed *communications subjects* as unnecessary distractions that took time away from the technical component which they considered as the only *true* part of their course. This paper describes the incorporation of a Fully Refereed Student Seminar on Computers in Society within an undergraduate subject. The students' commitment to honing their communications skills, via a public presentation of their technically-based research topics, was pushed to the limit as the proceedings were to be published through the State and National Libraries and the Australian Computer Society. The conduct of the seminar and the involvement of and benefits to the students are all discussed.

INTRODUCTION

The undergraduate subject, *Computers in Society*, is designed to give students who are about to enter into the workforce a broader perspective on their positions as computer professionals. In other words, it is one vehicle which stresses *education* rather than just *training*. Most of the computer students' other subjects may well have concentrated on the technical aspects of their prospective computer careers. This subject helps to *round-off* the educational profile so that graduates leave the University attuned to the needs of life-long learning, and equipped to fulfil a meaningful role in society. Recent commentaries on Australian higher education, such as Discipline Reviews, the Aulich Report and publications by the Business/Higher Education Round Table and NBEET note that employers are looking for graduates with more than subject competence [1]. They require people who are

also analytical, creative thinkers, committed to life-long learning, flexible, good communicators and sensitive to social contexts [2]. In 1992, a report by the Business/Higher Education Round Table, *Educating For Excellence*, stated that all graduates should:

> *have high order skills in the areas of written and oral communication, ... well-developed interpersonal skills,* [and be] *numerically and economically literate.*

Engineering and computer professional courses have a particularly strong vocational flavour. The review of engineering education (the Williams Report) concluded that Australia had a fairly good system of engineering education but *engineering schools paid too little attention to developing the communication skills of their students* [3]. In addition to this the Higher Education Council commissioned a study in 1992 to analyse newspaper advertisements and categorise the top twelve skills and attributes sought by employers; the results are as shown in Table 1 [4].

A more recent study, conducted by the UNESCO International Centre for Engineering Education (UICEE) at Monash University, surveyed the Chief Executive Officers of companies employing engineer-

Table 1: Skills and attributes requested by employers.

	Skills Requested	Attributes Requested
1	Oral communication	Motivation
2	Written communication	Initiative
3	Managing	Commercial awareness
4	Analytical	Creativity
5	Leadership	Energetic
6	Computer	Ambitious
7	Interpersonal	Self Starter
8	Teamwork	Enthusiasm
9	Research	Hands on approach
10	Supervision	Innovative
11	Organising	Results orientation
12	Negotiating	Flexibility

Table 2: Ranking of engineering graduate key qualities.

	Key Quality	Ranking (%)
1	Attitudes	96.9
2	Technical Knowledge and skills	92.3
3	Intellectual skills	89.2
4	Standards of engineering practise	89.2
5	Business practices	66.2
6	International/national history and culture	43.1
7	Proficiency in foreign languages	33.9

ing graduates [5]. The survey was issued to 707 leading engineering companies and drew 81 responses. The researchers identified seven key qualities required of an engineering graduate. The CEOs were asked to rank these key qualities in order of importance for a practising engineer. Table 2 shows the main findings of their survey.

The most surprising finding was the very high ranking of attitudes and intellectual skills. Technical knowledge came in at number 2. This reinforces the view that technical knowledge is important, but also raises the question as to where qualities 1 and 3 are being inculcated within the curriculum.

This paper describes an area of the curriculum, and one of the activities within that area, that we have created to develop these important qualities in our students. This is achieved through a final year subject called *Computers in Society*.

By the time that students take this subject (in their last semester before joining the workforce), they are becoming more receptive to the idea of enhancing their employability by developing their own communication skills. Up to this point many had viewed *communications subjects* as unnecessary distractions that took time away from the technical component which they considered as the only *true* part of their course. Prior to this, 53% of those surveyed believed that *education is the theory part of a subject and training is the practical part*; and 47% believed that courses *should contain more training* [6].

What was needed was a vehicle to harness this new-found receptiveness in students to improving their communications skills by giving them a challenge which they could all rise to. Peer assessment of public written and oral presentations can be a very strong motivator for students, as the need to communicate to their peers would require students to practice their English skills constantly; and, as the old saying goes, *practice makes perfect* [7]. A student seminar set in a realistic, professional context seemed to be the ideal solution. After the inaugural seminar, which was a great success, it was decided to make this an annual event. It was also decided to broaden its impact on the local community and to make the seminar a highlight of the final semester of the students' course.

THE ORGANISATION AND THEME OF THE INAUGURAL SEMINAR

This seminar was designed to be part of the broader learning experiences which are part of the *Computers in Society* subject. To present the students with a learning experience which they had not experienced before, the seminar had to be a very formal event. The general theme of the seminar was the use of computers in modern society. The title of the seminar was *The Inaugural Australian Student Seminar on Computers in Society*. The seminar took almost an entire day towards the end of the students' final semester.

The seminar was conducted in a thoroughly professional manner. Well planned conferences always provide guidance for authors. This seminar followed the standard best practices

Students were given a two-page comprehensive list of *Instructions to Authors*, which set out details such as font type and size, column layout, margins, style for the title, abstract and headings and referencing style. A sample paper, which included examples of all aspects of the layout and style requirements, was also provided for their guidance. As far as possible we attempted to put the students through the same process that we ourselves went through in preparing this very paper: deadlines, paper format, review process, etc. The students were also informed that they should prepare their papers for a target audience that would include not only their own colleagues but also students from other faculties, staff members from their own and other

faculties, visiting experts in the field and University management. The only thing the students did not have to go through was the application to attend with the payment of the accompanying fees for conference delegates.

The students are not thrown into the deep end, however. In earlier years they have been coached in public speaking and have had considerable experience in presenting project progress reports to their classmates and lecturers. They have been trained in the use of PowerPoint and other presentation tools. They have also gone through mock employment interviews with senior staff from across the University and have been involved in poster presentations and debates.

The topic areas were deliberately chosen to widen the intellectual capacities of the students by encouraging strategic thinking. Technical topics from the normal technical, teaching program were not allowed. Papers were to be presented by pairs of students and each pair was allowed to select their own topic. No two topics were to be the same, so some pairs had to make a second choice because of the similarity of their choices.

Students were given one week to prepare an abstract of their proposed paper. The abstracts were duly submitted and refereed by a panel of experienced academics who themselves frequently publish their own work. Students received replies within one week. Selected authors were then invited to submit the full text of their papers in the appropriate format for the seminar. Students were allocated six weeks to prepare their papers. The full papers were subjected to a second refereeing process by the editorial/refereeing committee. This was, again, done within a week.

At this stage, some papers were accepted without further modification, some required further attention before being acceptable and some were considered unacceptable. Of 13 groups, 11 papers were eventually accepted for the seminar. All but one of the 11 selected required further work before final acceptance. Individual counselling was provided to encourage students to meet the exacting standards that they had been set. The papers that were accepted were presented in the seminar and published in the seminar proceedings. The proceedings, therefore, represent the students' insights into the wider use of Computers in Society. The two groups of students whose papers were not selected for the seminar were given the opportunity to present an extended version of their chosen topics in a less stressful and less formal setting in the following week.

The theme of the seminar was the wider ethical, social, legal and moral implications of the use of computers in modern society. In order to emphasise the theme and to provide a focus, we thought that it would be appropriate to give the students an opportunity to present to an external expert, who would be able to respond in an encouraging manner to their work.

We were fortunate enough to secure the services of A/Prof. Peter Thorne of Melbourne University and Ms Jo Moylan of the Australian Computer Society. Peter has been involved with the legal as well as the technical aspects of computer systems for many years, and frequently acts as an expert witness in court cases concerning contracts involving the use of computer systems. Jo has been involved in the upper level management of computer systems with several national and international companies. She is a regular speaker on professionalism in the computer industry on behalf of the ACS. Each agreed to make special keynote presentations and to act as a discussant and present a summary of their particular session. The titles of the papers, listed below, clearly illustrate the strategic and wider intellectual nature of the topics chosen by the students.

Morning session

Ms Jo Moylan, *The Role of Professional Bodies in the Computer Industry* (Keynote Address)

Student papers:

* *Faulty Computers and their Impact on Society*
* *Copyright Law, Rights and Infringements in the Multimedia Age*
* *Computer Ethics: Privacy on the Internet*
* *Credit Card Sales and Secure Transactions Over the Internet*
* *Ownership of Code Using Fourth Generation Languages*

Ms Jo Moylan, Summary and session closure

Afternoon session

A/Prof. Peter Thorne, *Ethical Aspects of Computer Contracts* (Keynote Address)

Student papers:

* *Ethics of Internet Usage in the Workplace*
* *Censored Surfing*
* *Can I Speak?*
* *Has Society's Moral Obligation to Children Been Surpassed by Technology?*
* *The Ethical Issues of Information Technology Services in the Public Domain*
* *Computer Crime - Prevention and Detection*

A/Prof. Peter Thorne, Summary and session closure

A STUDENT SEMINAR WITH AN AUDIENCE INVITED FROM LOCAL SCHOOLS

Following the success of the inaugural seminar, we decided to broaden the impact by involving the local secondary school community. The theme of the second seminar was developed to be of particular interest to those about to enter their final year of secondary school and study Information Technology.

Again, the topic areas were deliberately chosen to widen the intellectual capacities of the students by encouraging strategic thinking. Topics with a strong technical content had to have the educational or social benefits expounded. Failing this, students were expected to perform a personal retrospective on the application and usefulness of the technology. As in the previous seminar, papers were to be presented by pairs of students and each pair was allowed to select their own topic from those available in the study guide for the VCE Information Technology subject. No two topics were to be the same, so some pairs had to make a second choice because they had chosen similar topics from the three different streams of the VCE syllabus: Information Processing and Management, Information Systems and Information Technology in Society.

Unlike the inaugural seminar, we chose not to invite keynote speakers as the undergraduate students were, themselves, to be the experts at the seminar. We did, however, invite the Head of School to make an opening address to emphasise to our own students the value placed on the seminar by the University. The titles of the papers, listed below, clearly illustrate the direct relevance of the topics to the VCE Information Technology subject.

Morning session

A/Prof. Neil Barnett, Head of School, Welcome and opening address

Student papers:
- *The Impact of Information Technology*
- *Preventative Measures for Data Integrity and Security*
- *Computers, Supercomputers, Science and Society*
- *Images of the Future*

Afternoon session

- *Data Structures and Algorithms in Programming*
- *Problem Solving & Programming Languages*
- *The Impact of Information Technology in Society*

- *The Costs and Benefits of Information Systems*
- *Computer System Design*

The organisational details of the inaugural seminar with respect to the timing of the event, calling for papers etc, were retained for subsequent seminars. This time the students were informed that their target audience would also include, as a major focus, senior secondary school Information Technology students.

From the 15 groups of students enrolled in the subject, and therefore eligible for this seminar, nine papers were eventually accepted for the seminar and one group withdrew. All but one of the nine selected required further work before final acceptance. Papers that had been accepted were presented in the seminar and published in the seminar proceedings. The proceedings, therefore, represent the students' insights into the validity and usefulness of the material in the VCE in Information Technology. As in the previous year, the five groups of students whose papers were not selected for the seminar were given the opportunity to present an extended version of their chosen topics the following week.

THE CONDUCT AND AMBIENCE OF THE SEMINARS

Everything to create a realistic professional seminar environment was considered. The room chosen is the University's showpiece conference venue at the Footscray Park Campus. This room is normally reserved for special events. Presenters, seminar delegates and guests all received a *seminar pack*, which included, amongst other things, a complete set of the proceedings and, for the inaugural seminar only, a copy of the Australian Computer Society Journal Special Issue on *Ethics and the Internet* (with permission of the ACS) [8]. Students were encouraged to dress for the occasion, ie to be well-groomed, looking like young professionals. The University's Corporate Catering Service provided a superb hot and cold light lunch and the usual *tea-break* refreshments. Each session was chaired by a different student who introduced the speakers, kept time, managed the question sessions and proposed a vote of thanks to all involved in the session. Other students acted as *tour guides* for our guests. Presenters were encouraged to *network* with the audience during the lunch break. All in all the students were made to feel that they were part of a very special event.

PUBLICATION OF THE SEMINAR PROCEEDINGS

As each of the seminar papers had undergone such rigorous refereeing, it was decided to publish the proceedings. This was done in two ways: firstly the

ACS reprinted *Credit Card Sales and Secure Trans-actions Over the Internet* (which they considered to be the best paper) in the Victorian ACS News [9]. Secondly, the entire proceedings were made available within the School and were lodged with the University Library, the Victorian State Library and the National Library of Australia where they were allocated ISBN 1862724946, for the inaugural seminar and 1862725217 for the second seminar.

BENEFITS TO THE VARIOUS STAKEHOLDERS

Three different *groups* gained from this exercise, namely the students themselves, the local community in general (represented by local schools but more particularly those involved in VCE Information Technology) and the University.

Benefits to the students

The two external keynote speakers were very positive about their experiences at the seminar. Both expressed admiration for the quality of the student papers and the very professional manner in which the students had carried out their various tasks. Peter Thorne went one step further by indicating his interest in holding a similar event in conjunction with his own students from Melbourne University at some future date. This is a particularly exciting prospect as it would give our students the opportunity to compare their achievements with those of students from another university.

Feedback from the students immediately after the seminar suggests that they all found the experience to be a very worthwhile addition to their usual technical education. Thinking and writing about non-technical aspects of their chosen careers was an intellectually extending experience for them.

The discipline of meeting very exacting requirements in terms of the style of language, the format of the presentation and precise deadlines was a valuable learning experience for most of the students, and one that will stand them in good stead when they are applying for jobs.

The students agreed that the experience had been worthwhile. We believe that this is particularly so as, within the Faculty, approximately 42% of those entering into first year come from Non-English Speaking Backgrounds. As stated earlier, it is very difficult to convince students of the vital importance of written and oral communication as part of their overall education.

The publication of the proceedings provided the students with an even greater incentive to produce their very best. Firstly, it meant that their efforts could receive a much wider audience than they had ever expected; and secondly, if their offerings were good enough to be selected for the seminar, they would have a refereed seminar publication to offer to prospective employers in addition to their degrees. The students had to think in a *strategic* rather than a purely technical manner. It was necessary for them to concentrate on the nature of the target audience and ensure that their presentations were of value to *that* particular audience. Finally, the seminar presented the students as members of the local community, with something to offer to the community.

Benefits to the local community

One might ask how does the work of undergraduate university students benefit the local community? The answer comes in several parts:

- local secondary school pupils were the audience specifically targeted to benefit from the seminar;
- the topics were from the VCE Information Technology subject;
- the seminar was designed to be a refreshing change for those sitting the subject by giving an alternative perspective on the usefulness of the subject material from the perspective of first-time practitioners;
- the audience was able to witness thoroughly professional presentations given by students only a few years their senior.

Benefits to the University

The benefits to the University occur mainly in the area of public relations and image. One of the strategic mission statements of the University has been to become accepted as the *University of first choice* for prospective students from the Western Suburbs of Melbourne. Schools are the lifeblood of all universities. This type of activity places the University at the heart of local community activities and shows Victoria University as the friendly, approachable, accessible and *local* university. Most schools protect their year 12 pupils from blatant advertising by universities. Good year 12 co-ordinators very quickly differentiate between events that are of genuine benefit to their charges and mere advertising ploys, and avoid the latter. By combining the provision of a service to the schools with an opportunity to demonstrate the professionalism that young people can be achieve through a Victoria University education, we believe that we have created a *win-win* situation.

OUTCOMES AND INITIAL ASSESSMENT

Many of our students expressed discomfort with the non-specific nature of the topics, ie the lack of detailed, technical matter. Some suggested that a student's own final year project would be a better topic for a future seminar. These comments reflect the students' discomfort with handling generic rather than purely technical matters, but this is *exactly* what the whole exercise was about.

Many students commented on the difficulty in capturing and maintaining the attention and interest of the audience. Some felt that the mode of communication chosen for their presentation could have been more dynamic to overcome this problem. Some suggested that the audience was *unsuitable* and that, perhaps, our own first year students would be a better audience. What the students were, in fact, saying was that their presentations might not have been as impressive as they had hoped, so they wanted to change the *audience* to match the presentations.

Several expressed the opinion that the audience had not *given them a fair go* by talking or otherwise failing to pay proper attention during the presentation. What the students were actually saying was that behaviour that they had considered *acceptable* on their part, they now considered *unacceptable* when they, themselves, were the presenters. One student actually said *I did not realise how distracting it could be to have someone talking at the back of the room all the time!*

Many students had not realised the amount of preparation required to ensure the accurate timing of their presentations, and had to be *hurried* by the session chairman.

CONCLUSIONS

Having been through this sort of experience for ourselves on many occasions, we believe that setting language and communication skills in a meaningful and relevant context is a particularly efficacious way in which to instil such an enthusiasm for learning that students accept much more of the responsibility for themselves. This means that we can assume the role of facilitators of their first steps into life-long learning.

It is very easy to sound as though you know what you are doing, while at the same time hiding behind the technical jargon of a subject. It is only possible to strip away the technical façade, however; and present a topic in a very simple, easy to understand fashion, when you really *do* know what you are doing. In this public seminar, with many teams of students participating, all students had the need to communicate their own chosen topic to the whole audience. To do this it was necessary for them to replace the jargon, often used between students taking the same course, and simplify the topic to ensure that all could follow. Most students managed to achieve this and produced papers that they were proud to put their names to.

It is possible to *over questionnaire* students. This was one subject in which we decided to conduct informal discussions and debriefing sessions to gauge student response. The quality of the presentations, the commitment and conduct of the students during the seminar and the positive comments by the external experts all bear testament to the success of the venture.

FUTURE PLANS AND DIRECTIONS

We have several plans for the future. The first is to increase student ownership of the activity by:

- allowing students to decide on the day's activities, eg demos, workshops etc;
- having student representatives on the refereeing panel;
- facilitating the formation of *Student Peer Support Groups*.

Our second plan is to increase audience attention and participation by the use of shorter sessions with a more rapid change of activity. This will encourage a wider variety of student presentation styles, which could include:

- video;
- role Plays [10];
- audience games, interactions, etc;
- short/small workshops.

Our ultimate goal is to extend the scope of involvement across the University to include all faculties that have a computing theme. We want to create a program of activities, in support of VCE studies, offered by students of several faculties. This would then become a regular feature of the University calendar.

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BIOGRAPHIES

Alec Simcock is a senior lecturer in the School of Communications and Informatics at Victoria University of Technology. He graduated from the University of Kent in 1972 with a BSc (Hons) in Electronics, and then worked for 12 years for the Procurement Executive of the Ministry of Defence in the United Kingdom. During this period his major research interests were in digital circuit design, digital data switching, computer controlled communications systems and the use of embedded microprocessor systems to replace hardware. In 1984 he joined the then Footscray Institute of Technology as a lecturer in communications, circuit theory, computer programming and digital systems. He has been course director, year supervisor, section leader, selectionofficer, etc. While doing all of this, he obtained a Master's of Engineering in 1990.

He currently teaches mainly in the areas of computer systems, embedded systems, microprocessors, computer technology, community-based project applications and the wider impact of the use of *computers in society*. His main research interests are in the fields of alternative teaching tools, teaching effectiveness and ethics and morals in computer usage. His technical research interests are in neural network applications, decision support tools and super system support.

John Chlond is a lecturer in the School of Communications and Informatics at Victoria University of Technology, Australia. After graduating in Electrical and Electronic Engineering from Preston Polytechnic in the United Kingdom, he worked in the field of electronic instrumentation design, including electronic weighing systems and intensive care patient monitoring equipment, before becoming a lecturer.

He has almost 20 years experience teaching electronic system design at the tertiary level and recently completed a postgraduate Diploma of Education. His major interest is in teaching entry level engineering students, working with local secondary schools to improve science teaching and community liaison. Student motivation and the school to university transition are major areas of his teaching development work. John's technical interests are in the area of hardware description languages, logic synthesis and rapid prototyping technologies including field programmable gate arrays.

3*rd* *Baltic Region Seminar on Engineering Education:*
Seminar Proceedings

edited by Zenon J. Pudlowski, Claes Niklasson & Said Irandoust

The 3*rd* *Baltic Region Seminar on Engineering Education* took place at Chalmers University of Technology, in Göteborg, Sweden, between 3 and 5 September 1999.

This Seminar series has the on-going objective to bring together educators from the Baltic Region to continue and expand on debates about common problems and challenges in engineering and technology education, and to examine the need for innovation in engineering and technology education. Further, it seeks to foster the links, collaboration and friendships already established in the region.

The 49 papers in these proceedings present the views of senior academics from 18 countries, with the focus coming from those in the Baltic States, including Sweden, on such diverse issues as:

- Innovation in engineering and technology education
- Effective methods in training engineers & technologists
- Industry requirements of engineering & technology education
- Sustainable development and environmental engineering education
- Engineering & technology education in other countries
- Management of engineering & technology education in institutions
- Academia/industry collaboration programs
- International collaboration in engineering education
- Further and continuing, education needs of engineers and technologists

All of the papers included in the Proceedings underwent a process of formal peer review, and it is anticipated that this volume of proceedings will prove to be a valuable resource for those involved in the development of systems of engineering and technology education in the Baltic region and internationally.

To purchase a copy of the Congress Proceedings, a cheque for $A50 (+ $A10 for postage within Australia, and $A20 for overseas postage) should be made payable to Monash University - UICEE, and sent to: Administrative Officer, UICEE, Faculty of Engineering, Monash University, Clayton, Victoria 3800, Australia.
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