Exploring the Impact of Information Technology on Society

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ABSTRACT

When the postgraduate computing programme at UNITEC Institute of Technology was developed it was considered essential that all students, whether undertaking a master's degree or postgraduate diploma, should examine in depth the impact of information technology on society. Since students with a strong technical background may not have much, if any, experience of exploring social issues, the teaching staff have had to identify an approach that would appeal to the students and ensure their involvement. This paper outlines the structure of the programme, profiles the members of the class, explains the approach taken by the lecturers, and reviews the learning experiences of staff and students.

Keywords

Postgraduate programme, social issues, learning experiences

1. INTRODUCTION

The postgraduate computing programme at UNITEC Institute of Technology was approved by the New Zealand Qualifications Authority in December 1999 and classes began in February 2000. Students may complete a Postgraduate Diploma in Computing, consisting of two compulsory courses and six optional courses, in one year of full time study (or the equivalent part time). The Master of Computing requires four compulsory courses, and either three optional courses and a thesis or seven optional courses and a dissertation; it may be completed in two years of full time study (or the equivalent part time). At present the optional courses focus on enterprise networks, instructional technology, interactive multimedia, and the Internet (Joyce,1999).

The development process for the programme took more than a year and involved extended consultations with academics (at UNITEC and at other tertiary institutions in New Zealand, Australia, the USA and the UK) and industry representatives (Joyce and Young, 1999). All those consulted were supportive of the development team's proposal that the first of the compulsory courses (referred to below as the "801 course") be called The Impact Of Information Technology On Society and that it explore past, present and future impacts and ethical issues. It was recognised that some students may prefer to concentrate on technical matters but it was hoped that all would benefit from taking a wider view.

2. DELIVERY

To accommodate the needs of students in full-time employment, classes are held at weekends. Each course

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meets on four weekends, about a month apart, for four hours on Saturday and four hours on Sunday. Beginning a month before the first class meeting, lecturers and students exchange information, ask questions and offer answers using a discussion board set up for the course on the UNITEC website. In addition, lecturers and students communicate by email, telephone and face-to-face meetings.

3. THE LECTURERS

The coordinator of the 801 course, who facilitated three of the four weekends, is an associate professor of computing who has held academic posts in the UK, New Zealand, Fiji and Papua New Guinea and has been writing about the impact of information technology on society for twenty years. The final weekend was facilitated by a professor of business ethics, who has published extensively in the field, and a recent doctoral graduate in the ethics of computing.

4. THE STUDENTS

The 16 class members included five computing practitioners, five tertiary teachers, two secondary teachers, two technical support staff, a librarian and a sales representative. Four of them already had postgraduate qualifications, another five had bachelor's degrees, a further five had diplomas at various levels and the remaining two had credits towards bachelor's degrees. Only three had studied arts or education subjects. All had significant practical computing experience (from six to 20 years).

5. THE LEARNING PROCESS

Students were encouraged to put on the discussion board before the first class meeting some details of their background and interest in the course content. Nine of the 16 students did so. At all class meetings students have been reminded to use the discussion board to supplement face to face interactions. At the time of writing, all but two students have contributed to the discussion board. A total of 126 messages have been posted, an average of eight per contributor. The most active contributors, with 15 messages each, have been the librarian and the second most experienced computing practitioner. The two technical support staff were the last to contribute! At times lively debates have been conducted via the discussion board. At other times, the main use has been for communication about assignments - topics chosen, sources of information identified, suggestions about lines to pursue.

The first face-to-face session began with introductions - the students said a little about their background and why they had chosen to undertake the 801 course at this point (although compulsory it does not have to be taken at any particular stage of the programme). The course coordinator outlined the course content and assessment, and stressed the importance of student contributions, whether in class, via email or through the discussion board. The class then collaborated in the construction of a timeline showing 25 key developments in information technology from the abacus to the Internet. The course coordinator explained the significance of each development and his explanations were supplemented by several knowledgeable students.

Next students were taken to the library, shown the shelves where the most relevant books could be found and asked to take out two books each for later investigation. The students were asked to identify overnight (within the books) positive and negative impacts of information technology that they were not familiar with. On return to the classroom, students were asked to complete a two page survey of their involvement with computers (including ways in which computers had made their own lives better or worse) and their predictions about ways in which computers could make the world better or worse in the future.

On the second day the survey questions were refined in the light of the experience with the survey. This involved rewording some questions to remove ambiguities and to simplify the analysis of responses. It also had the useful byproduct that the students felt greater "ownership" of the survey. Each student agreed to get seven respondents before the next class, one from each chosen age group (under 10, 10 to 19, 20 to 29, 30 to 39, 40 to 49, 50 to 59, and 60 plus). Cuttings of recent newspaper articles on the impact of information technology were then distributed and each student was allocated one to analyse before the next class. Their brief was to identify the main argument of the article and to provide further evidence, both for and against that argument.

The second weekend was taken up with preliminary analysis of the survey results and presentation of reports on the allocated newspaper cuttings and chosen library books. The survey responses from each age group (ranging from 10 to 17 in number) were allocated to a group of two or three students who were asked to report back to the whole group any significant issues they had identified. As intended, the seven survey reports, 14 newspaper

reports and 28 book reports raised a lot of issues and provided a lot of data for students to select from when undertaking their assignment work. They also helped create the desired learning environment of enquiry, discussion and evaluation and served as first steps in acquiring or enhancing research skills.

It was clear that an analysis of the 100 survey responses would be of interest to a wider audience, so the course coordinator proposed that a research paper be written and invited applications from the class for three "situations vacant". These involved respectively the storage and analysis of data, the identification of research questions and hypotheses, and the presentation of results. Three volunteers were forthcoming and are working with the course coordinator on a poster for presentation at this conference (Joyce, Nodder, Northover and Sprigode, 2000). Apart from making the results more widely available, this approach will give the three volunteers useful experience with conducting and publishing research.

The focus for the third weekend was an examination of likely future impacts of information technology, taking as dual starting points the newspaper reports from the second weekend and a deeper analysis of the survey responses on this topic. The preliminary analysis conducted during the second weekend had been extended by the four person research team and was further refined on the first day of the third weekend by the whole class, working in four groups of three or four. On the second day of the third weekend, the same groups were allocated an aspect of society (business, education, medicine, and work respectively) and chose a new or emerging technology to investigate (video conferencing, video streaming, virtual surgery and voice recognition respectively). The newspaper reports, survey responses, group reports and the students' own first assignments (on past and present impacts) provided students with a good basis for projecting into the future.

When ethical concerns are formally addressed in the final weekend, lecturers and students will be able to build on the earlier discussions, analyses and research. The emphasis is on identifying key ethical issues for society in the use of information technology and formulating feasible solutions for ensuring ethical behaviour. The ethical code of the New Zealand Computer Society will be analysed in depth.

6.   ASSESSMENT

The course is assessed by three written assignments, the first being a report on the past or present impact of one aspect of information technology on a sector of society, the second being a report on the potential future impact of a new or emerging technology on a sector of society and the third being an analysis of an ethical dilemma involving the impact of information technology on society. In the first two assignments each student chooses a specific technology and sector to be investigated.

Because it is part of the philosophy of the programme to encourage students to develop teamwork skills, at least one assignment must be based on teamwork. Because of the need to assess individual understanding of the course content, at least one assignment must be completed as a solo activity and the individual contributions to group assignments are assessed by the group members. Having been told the nature of the three assessments for the 801 course, the students quickly reached consensus that the first would be an individual assignment, the last would be a group assignment and the middle one could be either.

7.   EVALUATION

It is UNITEC policy that students be invited to evaluate each course and lecturer using a standard questionnaire involving 15 closed questions (for which students assign scores on five point Likert scales) and two open questions. Because these questionnaires are not conducted until the course is nearly over, students were given feedback forms during the second weekend of each course and invited to submit suggestions for improvement to the programme director at any time. In addition students were encouraged to comment on the 801 course face to face or electronically (via email or the discussion board).

All comments to date have been positive, with several students saying how much they have enjoyed the wide-ranging discussions, both in and out of class. Indeed, the most experienced computing practitioner wrote "801 ... I thought was initially going to be just a rubber stamp to get on the way to the rest of the course, especially since I had worked in IT through a large chunk of its impact... however I have found it more and more interesting to listen to everyone else's input and open my eyes to the wider world than the blinkered narrow view from inside".

8. CONCLUSION

Experience to date supports the strongly held belief of the development team for the UNITEC Master of Computing that all students would benefit from an indepth examination of the impact of information technology on society. Concerns that technically oriented students would not want to explore the social aspects of their discipline have proved unfounded. Of course, nearly half of the 28 students currently enrolled in the postgraduate programme have yet to undertake the 801 course, but there is no reason to believe that their experience will be very different from the present class.

In reviewing the success of the course, it would appear that several teaching strategies have helped create and maintain the high interest levels shown by students: * the use of the Internet as a resource and as a vehicle for communication * the encouragement of student contributions, both face-to-face and electronic * the early involvement of students in reading and evaluating source materials * the active participation of students in trialing, refining, administering and analysing the survey.

Needless to say, none of these strategies would have succeeded so well without such a willing and responsive group of students. It was noteworthy that all students, even those who appeared to have a highly technical emphasis in both their education and their work experience, contributed enthusiastically, explored the subject matter in depth and wrote thoughtful and interesting assignments. As a result the lecturers found the course both stimulating and satisfying to teach.

9. REFERENCES

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