Developing Research and Presentation Skills in Post Graduate Students

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Abstract
In this paper, techniques used with postgraduate computing students to develop research, analysis and presentation skills are explained and their success is evaluated. Several different techniques are used with students entering post graduate study at different levels. The courses at each level and the research forums are described and analysed.

Keywords
Postgraduate, presentation, research, skills

Introduction

Students new to postgraduate study in computing or returning to postgraduate study after a significant gap often need help in acquiring research, analysis and presentation skills. In some institutions, students must complete a course or series of workshops that cover such topics before they can commence their formal postgraduate studies. In other institutions, the opportunities to develop these skills are built into the course work and/or offered in parallel. This paper begins by reviewing some of the relevant literature and then describes and evaluates the approaches taken in two postgraduate computing programmes offered by Unitec Institute of Technology, the Master of Computing (MComp) and Doctor of Computing (DComp).

Literature

Whittle (1994) discusses a faculty-based research skills workshop program for masters students and their supervisors "which was trialed in the University of South Australia as a strategy to improve the teaching and learning environment for research masters students" and concludes that "providing students with structured research skills training at the commencement of their degree programs, can … improve the teaching and learning environment at the postgraduate level and help students to get off to a good start."

Webb and Sillitoe (1998) evaluated "a weekly discussion group, additional to the normal supervisory arrangements, [in which] a range of issues, including research philosophies, project conceptualisation, methodology selection, personal challenges and administrative procedures, were discussed … A 'twilight' midweek meeting time was chosen to maximise the opportunity for both full- and part-time students to attend …The findings indicate that the opportunity for students to speak in a diverse group to resolve project dilemmas as well as to showcase their own work, made a significant contribution to the development of broader understandings of the research process as well as stimulating deeper learning about specific aspects of research design, methodology and analysis."

Juniper and Cooper (2002) described a Postgraduate Research Training Programme which "adopted a workshop format which uses active learning exercises to stimulate thinking and discussion … in order to arrive at an understanding of the fundamental principles and processes of research, as well as to provide practical skills and strategies … Students undertake the programme voluntarily and are drawn from a wide variety of disciplines and cultural backgrounds." Student evaluations rated the programme very highly (4.47 out of 5).

Ingleby (2008) described a series of workshops at Deakin University which combine generic skills support of research students and supervision training for "early career researchers" who have recently completed their doctorates. The first set of workshops focused on the "development of a critical approach and the creation of a specific line of inquiry to encourage the formulation of a properly formulated research question".

Masters degree coursework

The first course that Master of Computing students undertake is called "The Impact of Information Technology on Society" with the course aim being "To enable participants to analyse the impact of information technology on society from social and ethical perspectives". The content of this course includes lectures and workshops on topics such as; what is research, research terminology, what is expected of students undertaking research, and this is taught within the framework of the impact of IT on Society. This content was deliberately included in this first course as the majority of students entering this masters degree have come from industry and have had a break in their study. Also many students who have completed undergraduate degree in other countries may not have gained these skills. The philosophy was to ensure that students as they continued with their post graduate studies were equipped with the knowledge and skills to conduct research, analyse data or present their findings.

In the first session of the semester 2 2009 course, students worked in pairs and interviewed each other about their opinions of the impacts (two positive and two negative) that information technology has had on them personally and the impacts (two positive and two negative) that information technology is likely to have on the world in the future. The whole class then analysed the responses into categories such as communication, education, health, information, leisure and work. Among the issues that came up were the challenges of categorising answers to open questions and what to do if the respondent mentioned more or fewer impacts than requested.

In earlier years (Joyce 2002) students in the same course had each interviewed seven people outside the class (ranging in age from less than 10 to 60 or more, with one per "decade", and including either three or four females). The 2009 students were shown the earlier results and asked to identify differences and similarities and suggest possible reasons for them. This led to discussion of sampling issues (including age ranges and gender bias), interpretation of results and changes in the (perceived) impacts over time.

Later in semester 2, 2009, students worked in pairs to analyse the content of professional codes of ethics (one code per pair) into categories (such as competence, confidentiality, conflict of interest, criticism and crediting others) that had been identified by students in the first DComp intake (Joyce et al 2003). The whole class then critiqued the analyses, which in some cases led to changes in the categorisation of particular elements. Finally the class produced a table analysing the content of the codes which was compared to the 2003 table. There was a lively discussion about the categorisation process, the differences between the codes and changes over time.

The first formal assessment item for this class includes assessed presentations and a report on the historical impact of an aspect of information technology on society and the potential future impact of a new or emerging information technology. The students present the historical impacts they have researched. These presentations lead into the assessed report on the future impact of an aspect of emerging information technology on society. During the historical presentations the students are urged to look at common themes and build a framework for assessing impact of technology. This assessment helps students to understand what evaluation frameworks are and how to use them when doing research.

The second assessment looks at ethical decision making. The students are asked to write an ethical case study about an ethical dilemma in an information technology project or a dilemma resulting from the use of information technology. The students are asked to use an ethical decision making framework to come to a decision resolving the dilemma that the students are able to defend or live with. The students present their case study to the class and then lead a 30 minute discussion about the ethical issues and principles in the case study. This discussion often shows the great impact culture has on ethical decision making.

During the presentations for both assessment items, the student peers asked questions about the content of the presentation and the instructor provided feedback about the presentation. The standard of the first set of presentations varied considerably and the instructor highlighted good and bad aspects. The standard of the

second set of presentations had improved significantly (both overall and individually) which suggested that students had learned from seeing the earlier examples and hearing the instructor's feedback (compare Joyce et al 2004).

Another outcome from the Impact of Technology on Society course has been the number of students who have been able to look at a wide range of potential thesis topics and in many cases the Masters topics that are ultimately selected by the students come from the work done in looking at the various emerging technologies and their impact on society.

In the end of course evaluation and in informal feedback, several students commented positively on the way in which the course had helped them develop research, analysis and presentation skills. Before they undertake their thesis research, MComp students continue to improve their research, analysis and presentation skills in other courses (particularly the Research Methods course).

In other semesters since 2000, other appropriate techniques have been employed to assist these students.

Doctoral coursework

The first course that DComp students take is called Critical Issues in Professional Practice and includes a topic on ethics. The first time the course was offered, there were six students and 18 professional codes of ethics were chosen for analysis. Each student independently analysed the content of three codes and then the whole class agreed on the categories and produced tables using the agreed categories to compare the contents of the codes. The next three times the course was offered, the categories were given in advance. All four times the course was offered there were lively discussions about the categorisation process and about the differences between the codes.

DComp students have to complete three assessed courses, each involving research and analysis of large volumes of published material. During each course they make multiple in-class presentations on their chosen research topic and receive feedback on content and delivery from their classmates and instructors. At the end of each course their final presentations are assessed by a panel of four academics, who provide detailed oral and written feedback. As with the MComp students, there is significant improvement in the quality of presentations.

Postgraduate research forums

Most of the post graduate students in the two programme undertake paid work during the week and all their classes are held at weekends. Accordingly the postgraduate research forums are held at 5pm mid-week (compare Webb and Sillitoe, 1998). The standard pattern for a forum is that two or three academic staff talk about their own research interests and topics they would like to supervise and answer questions (mainly from students), two or three students talk about their research proposals and receive feedback (mainly from academic staff). The programme director of postgraduate programmes then talks about some aspect of the research process (such as ethics approval or thesis examination). Attendance varies during the semester but averages around six staff and ten students. Feedback from MComp and DComp students indicates that the forums help them to identify possible supervisors and refine their research ideas.

Workshops

Te Puna Ako (Unitec learning support centre) provides workshops on topics like Academic Writing, APA Referencing, Literature Reviews and Managing the Personal Challenges of Postgraduate Study. Postgraduate students are encouraged to attend, especially the new students, but most find that as the workshops are held during the working day their participation is limited.

Analysis

Table 1 shows how the concepts, skills and strategies identified in the literature review are initially addressed at Unitec in coursework, research forums and workshops. These concepts, skills and strategies are explored in greater depth in the MComp Research Methods course and in the DComp courses Advanced Scholarly Enquiry and Research Development.

	Webb & Sillitoe	Juniper & Cooper	Ingleby	MComp Impact Course	DComp Issues Course	Research Forums	Work shops
Philosophies and Principles	Y	Y		Y	Y		
Developing Critical Approach			Y	Y	Y	Y	
Project Conceptualisation	Y					Y	
Formulating Research Question			Y			Y	
Methodology Selection	Y					Y	
Practical Skills and Strategies		Y		Y	Y		Y
Research Processes		Y		Y	Y		Y
Administrative Processes	Y					Y	
Personal Challenges	Y						Y

Table 1 Concepts, Skills and Strategies

Conclusions

Most new postgraduate students especially at the masters level have limited research, analysis and presentation skills, so analysing data in pairs and as a whole class and presenting to the class help them build confidence and prepare them for later courses, their thesis research and subsequent employment. Including in the content of the first course opportunities for students to acquire research, analysis and presentation skills has proved invaluable in their later study and ability to pass and gain high grades.

Most new DComp students have acquired some research, analysis and presentation skills during previous studies and employment, but need to have these enhanced during the coursework before presenting their research proposal to an invited audience of academics from a wide range of departments. It has been our experience that only a minority of MComp and DComp students attend forums and workshops, but those who do so have indicated how much benefit they have received by attending them.

From the student experience and feedback, and the analysis done it would be advantageous for the students to make these forums compulsory.

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