Assessment of ethical processes in computing education: Are we clean? How to tell?

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ABSTRACT

This paper contrasts two approaches to considering the ethical practices in a school of Information Technology in a tertiary institution. The first approach is that of a review of the processes employed and standards met in terms of a compliance checklist. The second is a novel application of a computerised project-based ethical assessment tool, SoDIS. Both methods independently recognise the interaction of engendering ethical behaviour in students, actually teaching ethics, and undertaking teaching and research in an ethically appropriate manner. The compliance method had more rigour in areas considered but completely missed some of the bigger picture questions raised by the SoDIS approach.

1. INTRODUCTION

It is of more than passing interest to know if the organization to which we belong, and indeed constitute, can be considered ethical. For an organization such as one undertaking teaching and research in Information Technology at a tertiary level, this is particularly relevant. Not only do we have normal interactions of any business, and these take the form of teaching and learning relationships, we should also aim to be producing graduates who perform ethically and responsibly. Further, our field, Information Technology, as an enabler of other fields, inherits the ethical concerns of those other fields. Staff and students undertake research projects in health informatics, biotechnology and education research.

How then, should a responsible school undertake such an evaluation? In this paper we contrast two approaches. This will identify key concerns and problems and help to identify evidence of further good practice for investigation and analysis. The two approaches were carried out independently by each of the two authors.

The first approach is a review of the processes we employ and standards we meet in terms of compliance. The second is a novel application of Gotterbarn's SoDIS (2001). Although intended for specific IT projects, we believe the approach of the system may be useful in the assessment of the ethics of the degree. We have had success with similar prompted question and follow-up systems before (Mann and Brown 2000).

2. COMPLIANCE ASSESSMENT

The Bachelor of Information Technology (B.InfoTech) is a three year undergraduate degree. It has been taught since 1996 and currently has around 270 students and 24 academic staff. This assessment curriculum, research and staff:student interactions in terms of approach to ethical concerns and compliance requirements.

Ethics are a stated objective of the degree: "Educate students to behave responsibly and ethically in an information technology environment" (OP 2002 pg1).

The B.InfoTech does not have a course in Ethics. The course "ET106 Ethics and Professionalism" as part of a Computing Environment module was taught in the degree until 2000. This course intended learners to "become familiar with ethical and professional issues related to the information technology industry and practise making decisions according to accepted standards" (OP 1995). It was taught with a theoretical and legal emphasis. The lecturer's report from 2000 stated "who-ever wrote this course…idea of what a course might be…but is perhaps a little inclined to overdo the possibilities". A not atypical student

evaluation asked "am I supposed to get my head around this stuff in five weeks?" to which the lecturer replied, "No, I don't. The point is that the subject is not reducible to Lego blocks…it requires a longer gestation…the course would make much more sense a later point in the degree (sigh)" [Lecturer report ET106 2000]. During end of 2000, the degree underwent a major review, including our approach to teaching ethics. After much debate, including consideration of several models of teaching ethics in the third year but as a first year paper, it was decided to drop the ethics course from the curriculum. It, and a similar course in Cultural Identity were removed to make way for an expanded interpersonal communication course and a new introductory microprocessor course. The justification was also philosophical, "we have long been uncomfortable with ethics and cultural identity being taught as though they were somehow separate and disjointed and so this move integrates them into the mainstream" (Art and Technology Faculty Board, Otago Polytechnic Sep 2000).

Ethics is now addressed in a number of courses. For instance, moral dilemmas are considered in communication courses at all levels, business ethics (client relationships, etc) are covered in Software Engineering and in Computers and Society, wider issues of human interaction with technology are based around topics such as readings of H.G. Wells' *Time Machine*.

Research in a tertiary setting invokes ethical procedures. The APNZ academic quality standard for research places a requirement to demonstrate "systems which address appropriately the ethical and intellectual property issues associated with research conducted within the institution" (APNZ 11.2.3). Consequently, Otago Polytechnic has a policy (AP1101.00) that describes an Ethics Committee:

> *"The purpose of ethical review of research[1] is to:*
> *·Provide assurance of safety to participants that their rights have been considered and respected, including establishing informed consent, confidentiality and the storage and use of data.*
> *·Protect those who may be affected by research results or outcomes…."*

([1]Interestingly the Academic Quality Management Manual states "purpose of ethical review of research *and teaching* activities is to…").

The Ethics Committee has a process including a form "to be completed by all applicants…for funding application" (AP1101.00). With instructions "do not omit any headings" (in bold) the form is complex and intended primarily for health researchers. Over several years N/A responses to questions on the form relating to the management of invasive procedures were used as reasons for rejecting software development funding applications, one researcher resorted to stating on the form: "no electrons will be harmed in this research". The health focussed ethics committee eventually recognised the folly in this approach, they too did not want to waste time, and so declared that some research did not require ethical consideration. Unfortunately, we were not happy with this either. Even if a particular study was considered ethically benign, we wanted a transparent process and evidence as to how this decision (not to proceed with formal ethical approval) was reached. To accomplish this we developed a 'departmental level ethics form' (Commerce Department Board of Studies). This form provided evidence of the decision that full ethical approval was not needed (or perhaps was). This approach was eventually adopted by the Ethics Committee in recognising two categories of research. The process has undergone continuous improvement and in the six months to December 2002, 13 research projects were confirmed as Category B (School Level, Figure 1).

The definition of a degree includes "taught mainly by people engaged in research" (NZQA 2003 p8). Within the school there is a strong belief of a close link between teaching and research. Teaching is informed by research, both of subject matter and teaching methods and is coupled with a principle that rigorous systematic methods of critical and creative enquiry should underpin any endeavour. This has several implications in terms of ethics. First is that we consider the students' industry projects to fall under the title "research" and consequently all complete the School level ethics form. In two years none have required forwarding to the central ethics committee. A second consequence of the link between research and teaching is that members of the school are frequently involved in research aimed at improving teaching practice. Being research this involves ethical approval, usually requiring participant consent forms and the like. It has not gone unnoticed by the staff that they can try a new teaching technique almost at will but if they want to be able to formally reflect and improve their teaching, then they open a whole "bureaucratic can of worms" (*pers comm.* 2/6/03). Despite these concerns, the process is working well, even for somewhat drastic inventions such as Smith *et al.*'s (2001) 'run over by a bus' experiment.

The third area of ethical consideration is in interpersonal interactions. The institution has a wide range of policies that describe topics such as privacy, impaired performance, harassment and so on. At a school level we are becoming increasingly transparent in dealings with students. Robust procedures for

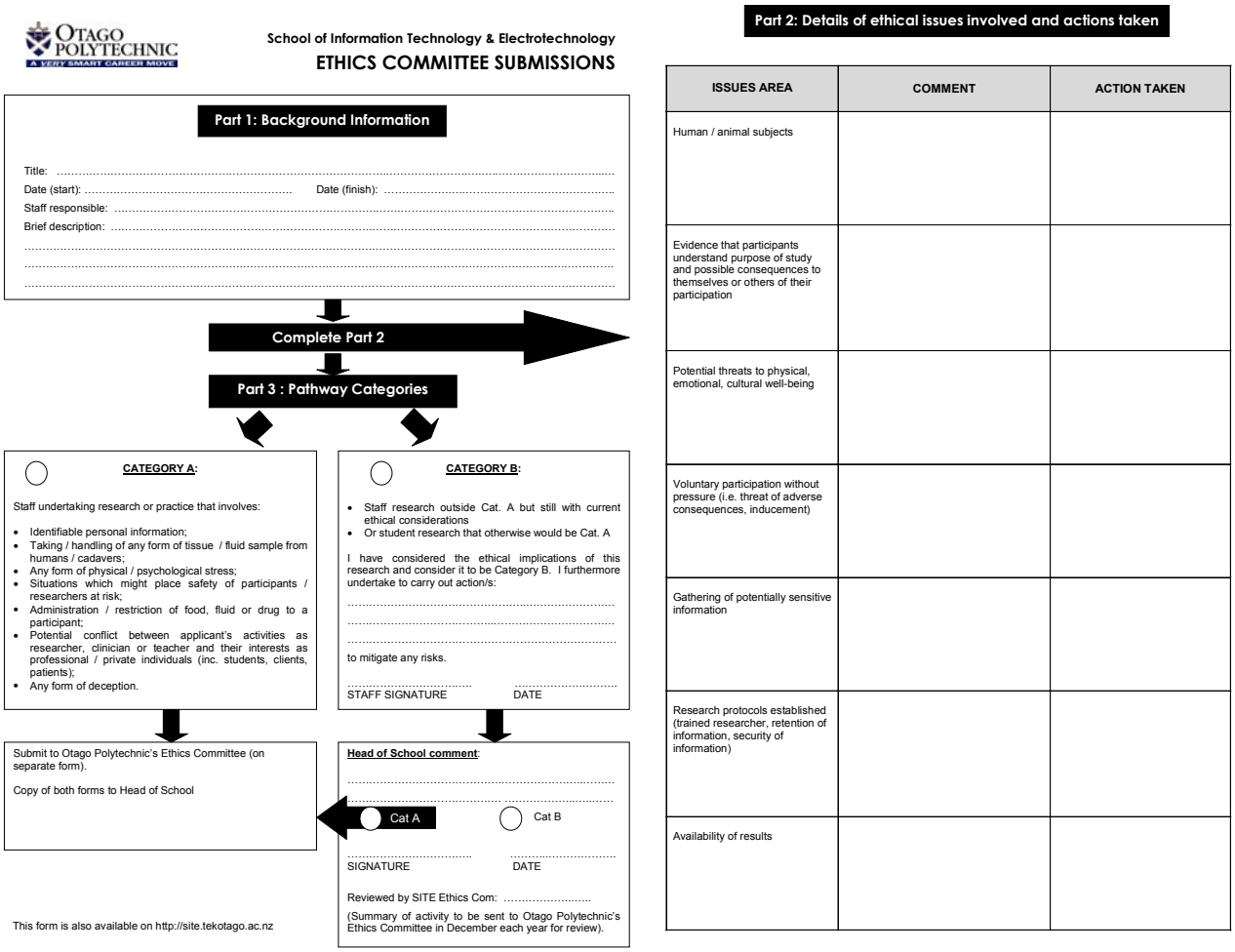

Figure 1: School level ethics procedure form

plagiarism, for example, have recently been developed, tightening up documentation that previously said "cheating is bad", but, as one student appealed, failed to say "don't do it".

The Otago B.InfoTech along with most other providers, prides itself on its "small friendly approach to teaching and learning" (Mann and Cowan 2000). A close relationship between staff and students does sometimes lead to ethical dilemmas, it is a regular occurrence that a lecturer comes to see the Head of School having found out more than they want to know about a particular student's habits, mental state or family arrangements and is not sure what to do with this information. We are yet to have a case of what might be considered improper behaviour between staff and students.

An issue that is frequently raised by students is the lack of clear intellectual property policy in the institution. In fact this is not the case, there is a strong policy, in short: the institution owns everything, we chose not to enforce that (a sensible policy has been promised for some years). In choosing not to enforce a particular policy we leave ourselves open to significant criticism and raises questions about "what other policies we chose not to enforce?".

3. PROMPTED HOLISTIC APPROACH

The SODIS process (Gotterbarn, 2001) was used to evaluate the ethical practices at Otago Polytechnic. The SoDIS Project Auditor is a tool that uses stakeholder impact analysis to identify, evaluate and mitigate risks in the software development process.

The application of SoDIS to the ethics procedures at Otago Polytechnic is outside the intended brief of the product, but as is stated in the SoDIS help documentation "the SoDIS process encourages the developer to think of people, groups, or organizations related to the project and how they are related to the proposed project and its products or deliverables". This seemed an admirable goal for our assessment of the ethics processes.

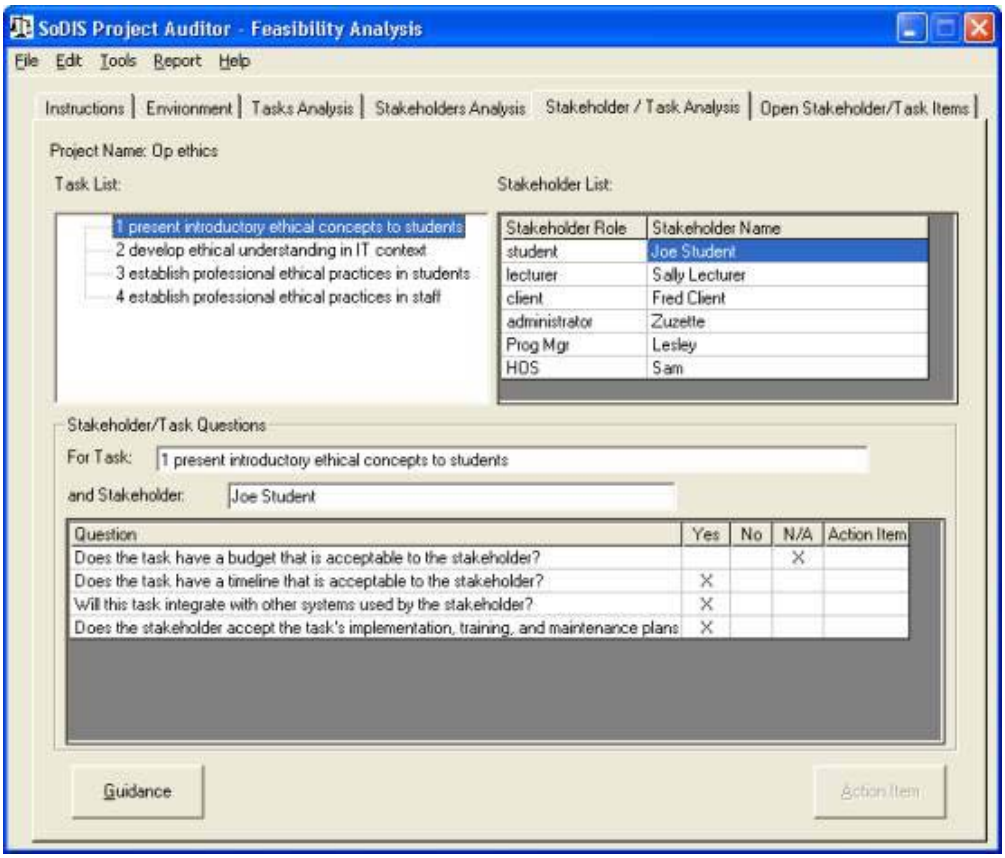

Figure 2: Gotterbarn's SoDIS used in assessment of school processes

Feasibility analysis was the first step in the SoDIS process. Here, basic project management issues are addressed to identify risks in the planning of the project. Immediately significant risks became evident, as the "project" had not been defined beyond a general understanding of the need for an ethical process at OP. Questions such as "Have project deliverables been defined, agreed upon, and recorded?", and "Is there a thorough, written agreement with the developer?" gave cause for concern and were immediately assigned action items. ("Action items are actions, identified by the analyst, which need to be completed to answer a question "Yes"", SoDIS Users Manual.)

On moving to the tasks analysis section (Figure 2) of the feasibility analysis, the following tasks for the project were defined.

1. Present introductory ethical concepts to students
2. Develop ethical understanding in IT context
3. Establish professional ethical practices in students
4. Establish professional ethical practices in staff

Analysis of the tasks included deciding whether each task had clearly defined deliverables and whether agreement had been reached between stakeholders about the execution of the task. Again, some action items were required to note the fact that there was no clearly defined plan for the overall delivery of ethical concepts and practices.

Identification of stakeholders followed. SoDIS requires the nomination of a role and name for each stakeholder but the purpose of the specific name was unclear – Fred Student and Sally Lecturer made an appearance as generic stakeholders. Is the addition of real names necessary for the analysis?

Assessing each of six stakeholders against the list of seven project planning questions took a while, with repetitive issues and action items arising. Unfortunately the action items are not re-usable. The final part of Feasibility Analysis was to assess each stakeholder against the four tasks, with a list of four feasibility questions. (6 * 4 * 4 = 96 decisions).

On completion of feasibility analysis, requirements analysis begins. More stakeholders identified, requirements defined and a detailed assessment of risks to stakeholders from the development.

An interesting issue arose at this point. Only two requirements had been defined:

1. Improve ethical practices in B.InfoTech

2. Increase awareness of ethical issues

Given that the purpose of SoDIS is to identify potential risks in a system, could the requirement "improve ethical practice in BIT" cause harm to any stakeholder? It seemed not, as all questions were answered in the negative. This is similar to the pest control question posed by Mann and Brown in their work with environmental assessment (2000). A negative requirement terminology would have resulted in a different outcome – for example, if there was no ethical education occurring at Otago Polytechnic, would there be a negative impact on the stakeholders?

Overall, the SoDIS process seems long and repetitive. It would be more interesting perhaps to have random questions presented automatically rather than manually working through endless lists. However, SoDIS served its purpose of forcing a consideration of the impact of a number of issues on a wide range of stakeholders. In our dealings with students we can easily lose sight of the role of project clients, who bring an industry perspective to the ethical debate. Clearly, the lack of defined outcomes and deliverables for teaching ethical practices is a major barrier to the implementation of such teaching. Reasonable guidelines for ethical practices for both staff and students would greatly assist in defining expectations.

4. DISCUSSION

This paper has constrasted two approaches to ethical assessment of practices: a compliance assessment; and a more holistic computerised appraoch (SoDIS). Both approaches found that for the most part our practices can be considered ethically appropriate. Neither were particularly quick to undertake, automating the question presentation in SoDIS would help in this regard. Both methods independently recognised the interaction of engendering ethical behaviour in students, actually teaching ethics, and undertaking teaching and research in an ethically appropriate manner. The compliance method clearly missed areas for which compliance is not appropriate or required but forced more rigour in the areas it did consider, particularly in looking for evidence. The SoDIS approach prompted consideration of a wider range of stakeholders and impacts. SoDIS also made it harder to ignore the big questions such as whether ethics should be integrated or stand alone course which the box-ticking approach glossed over. This paper has shown that a system does not need to be specifically tailored to education to be of benefit. A worthwhile area for future research would be a generically applicable automated version of SoDIS, especially if it was designed for ongoing assessment rather than specific projects.

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