Applying the New Software Engineering Code of Ethics to Usability Engineering: A Study of Four Cases

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ABSTRACT

It has been argued that it is in the best interests of IT professionals, to adopt and enforce professional codes in the work place. But there is no code for usability engineers, unless one accepts that it is a branch of software engineering. The new joint ACM/IEEE-CS Software Engineering Code of Ethics is applied to actual usability cases. This enables usability engineers to interpret this code in their profession. This is achieved by utilizing four case studies both directly in terms of the ethical issues involved and in the light of the code. Also examined are the short-comings of the code for the domain of usability engineering, and suggestions are made for enhancements for future revisions of the code.

COVERAGE

1. INTRODUCTION

The focus of this paper is on helping usability engineers apply the new joint ACM (ACM, 2000) and IEEE-CS (IEEE-CS, 2000) Software Engineering Code of Ethics and Professional Practice (version 5.2), hereafter referred to as the "SE code", to actual experiences. This version of the SE code has found acceptance by two major computing societies and has been adopted by many multinational companies (Gotterbarn, Miller and Rogerson, 1999a).

The cases in this paper are not artificially created negative scenarios, but sourced from the experiences of usability engineers in the field. Case studies have frequently been employed to illustrate ethical principles and particularly to highlight conflicts and prioritizations amongst those principles. Anderson *et al.* (1993) used cases to explore the then newly adopted ACM Code of Ethics. Similarly, Burmeister (2000) used case studies to illustrate the application of the ACS Code of Ethics to professional practice.

The link between software engineering and usability engineering has been established previously (Dowell and Long, 1989; Long, 1995; Colbert, Long and Dowell, 1995; Karat and Karat,1998). Karat and Karat (1998) first extended this link into a discussion of ethics by employing Human-Computer Interaction (HCI) case studies to illustrate the relevance to HCI of various aspects of the ethical codes of 30 comput-

KEYWORDS

Usability testing

Usability engineering

Professionalism

ing societies. In like manner this paper uses cases to illustrate the relevance to usability engineering of the SE code.

Usability engineering is both a specialisation within HCI and a specialisation of empirical software engineering. It's main concern is with the engineering of usable products, with a strong (human) user-centred approach to the design task. It is the human focus that mainly distinguishes it from other types of software engineering. Like empirical software engineering, it is a discipline concerned with metrics. Empirical software engineering includes such areas as the comparison of cost estimation techniques, the analysis of the effects of design methods and characteristics, the evaluation of testing methodologies and other types of metrics to do with software engineering. Likewise usability engineering is concerned with such things as user testing, measuring the time a task requires, error rates and the users' subjective satisfaction.

Given that this paper is an exploration of the Software Engineering Code of Ethics and *Professional Practice,* it begins with a look at the moral implications of being a professional. It does this by firstly laying the philosophical foundations which have given rise to the development of professional codes of conduct and then by exploring the notion of professionalism itself. The paper then goes on to explore four case studies. That exploration looks at the ethical issues in these cases, the extent to which the SE code sheds light on professional behaviour in these situations and further (related) issues that readers may wish to investigate. The paper concludes with a discussion of how the SE code might be enhanced to better aid the professional usability engineer in their work.

1.1 Ethics

Before beginning the examination, it is worth saying a little about ethics itself.

Ethics is, it is often maintained, just a matter of opinion, and what is right for me might not be for you.

While it might be conceded by many that there are problems that could be considered ethical, perhaps there is not much of importance which can be said about them. Ethics is, after all, it is often maintained, just a matter of opinion, and what is right for me might not be for you. This individualistic relativist view however, is not the position adopted here. Ethical beliefs might be, in some sense, a matter of opinion, just as all beliefs are, even scientific ones, but they are not, or should not be, *merely* opinions. Ethics can be discussed rationally and beliefs can be backed up by facts, for example, that is a certain situation humans will typically suffer, and tightly reasoned argument, and based on theory. This is not to say that there is not an important distinction to be drawn between relativist ethics on the one hand, and objectivist ethics on the other. The former states that all moral values are relative either to an *individual* or to a *culture*, and the latter that there are moral truths that are true in more or less the same way that scientific truths are. In this paper, however, we will assume that moral truths are either objective or that they are relative to a culture (this difference, *for our purposes*, does not matter). The acceptance of a code of ethics, or indeed of a legal system in general, must assume this. One distinction that must be discussed though, because it does have a bearing on later discussions is that between consequentialism versus deontology.

1.2 Consequentialism versus Deontology

Consequentialist theories state that consequences are all important in determining what is the ethical or moral thing to do. The best known of these theories is the utilitarianism, particularly as it was made famous by John Stuart Mill (1984). Mill's well known view is that the morally right action is that which produces the greatest happiness for the greatest number of people. Many varieties of utilitarianism have been developed to take account of various problems, but there is something attractive about the general idea. It does seem right that consequences are important in determining the rightness or wrongness of actions. On the other hand, some actions seem just wrong regardless of conse-

quences. A group of sadists might get enormous pleasure from torturing a homeless and friendless alcoholic living on the streets. Even if their pleasure was greater than the suffering of the lone alcoholic, there is something obscene in saying that their action is morally right just because of the pleasure produced in those sadists. This sort of example leads many to the view that some things are right or wrong in themselves, regardless of consequences, or of the intentions of the person performing the action, and this is deontology (interpreted rather broadly). Immanuel Kant (Rachels, 1986) for example, believed that lying was always wrong, regardless of the consequences. Looking at invasion of personal privacy and unauthorised copying in this light, those activities, if wrong, they are wrong in themselves, regardless of consequences even where those consequences might be good.

Clearly the theories outlined here have implications for the following case studies. It is true that the main concern here is to apply the code to those cases, but it is still valuable to consider the more general ethical questions in order to see what the issues are and how well the code addresses them, to see what actions might be appropriate where the code is silent, and to help where there is a clash of principles.

2. PROFESSIONALISM

Gotterbarn (2000) argues that a professional's work should involve understanding the profession's code of ethics. This is complicated for the usability engineer because their involvement with human participants means the codes of psychological societies rather than IT societies best address the types of issues they encounter in some of their professional practice. Yet if HCI is really to be considered a form of software engineering, then the SE code ought to be applicable.

Principle 6 of the SE code specifically addresses the concept of 'Profession', stating that "Software Engineers shall advance the integrity and reputation of the profession consistent with the public interest." For the SE code public interest and professionalism are inseparable.

The IEEE Computer Society has sought to elevate the professional recognition of software engineers by establishing certification requirements for software developers (Gotterbarn, Miller and Rogerson, 1999b). Added impetus to the importance of professionalism can be seen in the recent recognition by the Australian Council of Professions (ACP) of IT practitioners within the Australian Computer Society (ACS) as professionals (ACS, 2000), alongside doctors, lawyers, engineers and other professionals.

The moral implications of professional acceptance are demonstrated by the fact that that the ACP clearly link ethics and professionalism in the concept of 'public trust':

> "It is inherent in the definition of a profession that a code of ethics govern the activities of each profession. Such codes require behaviour and practice beyond the personal moral obligations of an individual.
>
> They define and demand high standards of behaviour in respect to the services provided to the public and in dealing with professional colleagues. Further, these codes are enforced by the profession and are acknowledged and accepted by the community." (ACS, 2000)

It is worth noting the force of the phrase "beyond the personal moral obligations of an individual." This is not arbitrary. Professionals tend to be privileged, both with respect to status and income, and have generally benefited from the education system to a greater extent than most people. More importantly however, professionals have expertise that others do not have, and therefore their opinions are trusted in areas of their expertise. This 'public trust' confers a duty of care. Because of the need to trust the professionals' expertise, others become vulnerable, both to intentional harm and to carelessness. Duty of care is concerned primarily with this carelessness or negligence. It is essentially the duty, in certain circumstances, to take care. One account states that "whenever a person is so placed in relation to other people that failure to exercise care may foreseeably cause them injury, a duty of care is owed" (Creyke and Weeks, 1985, p 1). The emphasis here is not so much on refraining from actions which intentionally harm others,

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but rather on taking care to avoid actions which are likely to unintentionally harm others. This duty highlights something that is easily overlooked. Those professionals who cause, usually indirectly and unintentionally, injury to others through negligence or carelessness, should be held accountable for their actions. None of us should be careless, but because vulnerability is conferred by the professionals expertise, professionals have a special moral obligation.

The link between ethics and professionalism is made explicit in Spinello's (1997) four features that qualify people as professional in any field:

1. There is a requirement for extensive intellectual training that involves mastering a complex body of knowledge.
2. There is an expectation of contribution to society through services provided.
3. There is an assumption of autonomous judgment in work carried out based on expertise.
4. There is a regulated set of behavioral standards embodied in a code of ethical conduct.

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2.1 Overview of the Software Engineering Code of Ethics

The SE code is divided into eight principles each of which has clauses that detail the application of those principles. As with other codes, the purpose of the clauses is not to be prescriptive, but to show how the spirit of the code as it is embodied in the principles, can be interpreted (Burmeister, 2000). Unlike previous versions of the SE code, the eight principles have been deliberately arranged in a particular order (Gotterbarn, Miller and Rogerson, 1999b), with the highest priority principle appearing first. The eight principles are:

1. **Public:** The public interest is the highest principle. When an ethical dilemma results in conflicting resolutions, in terms of the detailed clauses of the code of ethics, the public interest is to be the overriding concern.
2. **Client and employer:** Action choices must respect the best interests of both clients and employers. This is one area

of the code that should be expanded from a HCI viewpoint, to include the interests of human participants in usability testing.

3. **Product:** The products of software engineering, including all modifications, must meet the highest professional standards possible.
4. **Judgment:** A software engineer is expected to maintain integrity and independence in his or her professional judgment.
5. **Management:** Managers and leaders in software engineering are to promote ethical approaches to software development and maintenance.
6. **Profession:** The integrity and reputation of the software engineering profession is the concern of all software engineering professionals.
7. **Colleagues:** Fairness and supportive behaviour toward colleagues is a requirement of software engineers.
8. **Self:** Participation in life long learning as regards the ethical practice of the software engineering profession is required.

The cases that follow show that whilst the spirit of the SE code as embodied in these principles applies in usability engineering, the clauses that exemplify these principles in the current version (5.2) do not sufficiently deal with usability related issues.

3. CASE STUDIES

The following four case studies illustrate how the SE code can be applied in usability engineering. References to the SE code follow the numeric identification of the principles of the code (ACM, 2000; IEEE-CS, 2000). The code is divided into eight principles, with the first principle on the 'Public' being the guide to conflict resolution when there is conflict between the principles in a particular situation.

3.1 Method

The case studies presented here, and some of the related discussion, were first presented by Burmeister (2001a) in the context of the ACS Code of Ethics (they are

reused here with permission). The case studies were sourced from the international usability engineering community. Contributions to these cases came from Australia, England and North America. Usability engineers who contributed to these cases were either associated with the Swinburne Computer-Human Interaction Laboratory (SCHIL, 2001) or with a professional newsgroup for usability engineers (Howard, 1999). The cases chosen had to be sufficiently complex to illustrate a number of ethical principles. They had to encourage deeper thought on moral issues, not be ones in which moral implications were easily discernible, or trivial in nature. All cases were examples of situations real usability engineers had experienced or were a blending of such experiences. In each case identifying details and minor scenario details were altered to protect those involved and the identities of contributors.

3.2   Intellectual Property

Consider an HCI consultant with extensive experience in evaluating web sites and Graphical User Interfaces (GUI). She has just received an evaluation contract for a new accounting product made by company A due to her prior experience with e-commerce site evaluation. The work involves assessing the training requirements and the usability of the system. During the initial configuration of her usability laboratory she becomes aware that software she is to evaluate contains a GUI already patented by a rival company B, which she evaluated several weeks before.

Under her contractual agreements she is not allowed to discuss the evaluation of a product with anyone outside the contract. She therefore has an obligation to company B not to provide information regarding their product to anyone else without their permission. She has a similar obligation to company A.

Can she continue with the evaluation? If she cannot continue with the evaluation how does she inform company A of the patent violation? Does she have an obligation to let Company B know Company A has copied their GUI?

3.2.1   Ethical issues in this case

Underlying the various ethical issues in this case is that of the violation of intellectual property rights. Such a violation is certainly illegal, but whether it is also immoral is more contentious. When examined in detail its basis is not as solid as it is often assumed (Weckert, 1997), despite the commonly held view presented by Rogerson (1998) which claims that companies that

> *Those professionals who cause, even indirectly or unintentionally, injury to others through negligence or carelessness, should be held accountable for their actions.*

have invested resources in creating software are entitled to reap an economic reward. It is not obvious that the reward should come through ownership. But be this as it may, the fact that it is illegal raises the important issue in this case. The central issue is that of honouring contracts, and the more basic principle of keeping promises. The consultant has, in effect, promised to keep the information learnt in the consultancies confidential. The problem is that it is difficult both to do this and to let Company A know that they are doing something illegal. One ought, generally, to keep promises. On deontological grounds one might argue that to break a promise is to show lack of respect for the person to whom the promise was made, and as such is always morally wrong, regardless of whether or not the consequences are good. On a consequentialist view breaking promises is generally bad simply because the convention of having promises is a very useful one, and any promise breaking weakens that convention. However, in order to avoid a greater harm, in an individual case the right thing to do could be to break a promise. Perhaps in this example it is not too difficult to avoid breaking the promise of confidentiality. The consultant can just tell Company A that the particular GUI has been patented. She need not say how she knows this. But the situation may not be so simple, if she worked for Company B just a few weeks previously. It may be obvious that she learnt this while working for

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them, in which case she could be accused of breaking her promise to them. It may well be that by revealing anything at all she is breaking a promise to one of the companies. But if she does nothing, she is acting unprofessionally in not letting her client know that they are doing something illegal, and this too is unethical!

3.2.2 What help does the code provide?
The SE code principle that most directly addresses the issues in this case is the first on the 'Public'. This principle states that

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If I give informed consent, I freely consent to do something and my decision is based on full knowledge of the situation.

'Software engineers shall act consistently with the public interest' (ACM, 2000; IEEE-CS, 2000). As with all eight principles of the SE code, there are specific 'clauses' that detail how the spirit of the code as espoused in the principle should be implemented. Clause 1.02 advises that the usability engineer needs to moderate the interests of all parties with the public good. Though this may appear vague at first given the situation described, it does get the professional thinking about the long term issues involved. In other words, what action will benefit the majority in the long run.

Clause 1.04 addresses the need to disclose to appropriate authorities any potential danger associated with something one is working on. This suggests there is an obligation to make somebody aware of the situation. But who? Authorities in company A or company B? The answer may be seen in clause 1.07, which says the professional is to consider issues of economic disadvantage. Clearly a patent violation falls into the latter category.

Clause 2.02 warns that one should not knowingly use software illegally. Similarly clause 2.03 advises that software should only be used where proper authorization or consent has been granted.

In the above case the usability engineer is obviously concerned to keep the confidentiality of the previous and current

client. Clause 2.05 endorses this, but provides a way out: 'where such confidentiality is consistent with the public interest and consistent with the law'. In other words not just the ethical obligations of confidentiality and legal requirements of contractual agreements, but also the priority of public welfare need to be weighed by the professional.

One also has to remain mindful of the legal aspects of an intellectual property rights violation (addressed directly in clause 2.06). The patent is protected by law. Without ensuring that the company was permitted to use the product, prior to using it, the usability engineer exposes her employer to legal liability. Even if the product was sought merely for ideas and then the technology was completely written independently of the patented product, one should acknowledge the source in the documentation (for instance, clause 7.03 on fully crediting the work of others). Obviously judgment is called for here – if the intellectual contribution from the product is of a trivial nature, then there would not be a need to acknowledge it.

Yet this usability engineer is caught between the proverbial 'rock and a hard place'. She could work for company A legally perhaps with the view that 'if they get sued, that is their problem'. But morally she should not take this course of action. She should hold confidentiality for the previous employer (company B). If the patent has been filed and her current employer (company A) has no knowledge, then she has conflicting ethical imperatives that need to be resolved.

We suggest that the answer lies in the highest principle of the code, that of 'public interest'. A professional, be they a usability engineer or a software engineer has a responsibility foremost to the public interest. Professional judgment is needed to decide how this is best served in difficult moral decision making. Long term both companies face possible legal costs that serve neither them nor their customers. Therefore it may be argued that public interest is best served by contacting company B and asking permission to use the patented GUI without revealing company A to company B.

Another alternative is that given that this is a web-based case study, she could point company A to the web site of compa-

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ny B, without revealing that she had worked for company B. If this were an intranet situation then this latter alternative would not be possible.

3.2.3 Further investigation

Further issues to explore in the area of intellectual property might include an examination of the use of (web) style guides, such as the Sun Microsystems Java style guide (Sun Microsystems, Inc., 1999). The use of such usability style guides, without acknowledging their use, is common practice in many companies (Burmeister, 2001a).

Another related area for readers wanting to pursue this area further, is that of reverse engineering patent infringement law suits and counter suits. Spinello (1997) devotes several sections to this, covering both US and Japanese laws.

3.3 Internal Users

An internal usability team wanted to perform a usability test on a website using half internal and half external participants. Would the consent form designed for external users also be used for the internals? Some members of the usability team argued that the terms of employment were sufficient to require internals participate. Others argued that the purpose of 'consent' was to ensure that participants understood why they had been asked, what was going to happen, what data would be collected, how it would be used and that they were free to leave at any time. Given that the company has paid for usability testing, and given that the employee has agreed to work for the company for payment, is the employee really free to leave?

3.3.1 Ethical issues in this case

Central in this case is the slightly murky notion of 'informed consent', and the even murkier notion of freedom. If I give informed consent, I freely consent to do something and my decision is based on full knowledge of the situation. The problem in this case is not with 'informed' but with 'consent'. There is obviously a sense in which the employees can freely consent to participate and freely leave if they so desire. They are free not to participate, we can assume, in the sense that they will not

be shot or sacked immediately if they do not. And they are free to leave in the sense that the doors are unlocked and there are no guards stopping them. There may however be covert pressure to participate and to remain until the end. They may wonder what the effect will be on their long term job prospects if they do not consent. If this is the case, it is not at all clear what force there is in the notion of 'consent' here, or in that of 'freedom'.

Say an internal participant (employee) presented for usability testing who, when confronted with what is expected of them, chooses not to sign the consent form. Given that the employee is expected to be away from their work area for a period of time (say 3 hours), what are the ethical implications? If the employee returns to the work area well ahead of time what are the implications for the researchers conducting the usability testing? Also what are they for the employee who may be questioned by her boss, putting her in the possibly awkward position of justifying why she returned so soon. Perhaps she declined to sign because she thought that what the company was doing was morally questionable, that is, she had a conscientious objection to participation in the study. But would she feel free to say that to her boss? Perhaps her declining participation had to do with how the test would be conducted or with the people who would be conducting the test? Whatever the reason, whilst it is relatively easy for external users to decline to sign an informed consent form,

> *Some might want to argue that employees would be expected to participate, simply because that is a requirement of their employer.*

internal users may have various perceived pressures such as these that make it very difficult for them to decline, even if they really want to.

Some might want to argue that employees would be expected to participate, simply because that is a requirement of their employer. In other words, informed con-

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sent procedures do not apply for employees, by accepting to work for their employer they have effectively accepted everything that goes with carrying out their work. Therefore participation is not optional for employees. Yet usability testing is not likely to be part of a standard employment contract. So this is debatable. The ethical issue then is really one of rights: when someone accepts a job, what rights does her employer gain with respect to her, and what rights does she forfeit?

Furthermore, if the employee, seeking to avoid a possibly awkward situation by returning to work early, does not return to the work area until the expected time (by say spending the 3 hours of company time to meet a friend, have a coffee, or engage in some other activity), what are the implications for the employee? If this became known someone might question the employee's motive – had they really intended to participate in the usability test or was this merely a clandestine attempt to gain paid leisure time? What are the implications for the researchers if the employee chooses to stay away from the workplace during this time? To whom are the researchers responsible, if asked by the employee's boss how that employee performed in the usability test – to the employee (protecting their right to decline participation) or the employer (on whose time the employee took an extended break)? From a consequentialist point of view, the employee *might* have done nothing wrong by having 3 hours of leisure (depending on how consequentialism is construed). If there were enough users for the testing then the researchers were not harmed in any way, and given that the employer was not expecting any work of that employee for those 3 hours there was no harm there either.

3.3.2 What help does the code provide?

The SE code demands both honesty (clauses 4.01 and 4.05) on the part of the usability engineer and protection of client confidentiality (clause 2.05). For the employee participant there is also the requirement of clause 1.06 to avoid deception, in other words, using this as a clandestine attempt to have a paid 3 hour break is unethical.

A drawback of the SE code for the usability engineer is that the code only distinguishes employers and clients. However

for the usability engineer the distinction is frequently between the employers and participants, which is not the same thing. For this reason inferences need to be drawn based on the spirit of the code as seen in the principles, rather than in the specific clauses of these principles.

In one sense, this is an issue that ought to be addressed by the management of the company and as such principle 5 on 'Management' applies. Clause 5.12 says employees should not be punished for expressing ethical concerns, which in this case means that a conscientious objection to participation ought to be respected.

In this case the participants are employees and hence principle 7 on 'Colleagues' addresses some of the issues. That is, the participants are colleagues of the usability engineers conducting the testing. This principle advises that one "shall be fair to and supportive of their colleagues" and not do anything that may adversely affect their career (clause 7.06).

There is no clear direction to this situation in the SE code, other than the injunction to always apply the spirit of the highest principle, that of the public welfare, when otherwise no clear direction is given. Certainly individual performance should be confidential. In situations like this it is not appropriate for managers to ask how an individual performed and it would be unethical to tell a manager who did ask the usability engineer such a question, about an individual's performance, let alone tell them that the individual refused to sign the consent form.

In the view of the authors the best approach in this case would be for the employee to return to work. Perhaps a way forward is to require a consent procedure of both the individuals and their managers. This could be a facilitated consent process involving a third person responsible to ensure both parties are aware of the confidentiality issues involved. This could potentially be extended to team based procedures. One usability engineer associated with SCHIL (2001) told the authors that one major Australian company he had work in had sent whole teams of employees to be tested together. This adds more undue pressure on individual team members to participate. Were one to refuse, they would potentially face peer pressure in addition to the types of situations raised in the above case.

A debriefing session would also be helpful. Internal participants (employees) who choose not to participate in a usability test may prejudice future testing of other employees if their reasons for non-participation are verbalized by them to their colleagues. One can minimize the potentially negative influences of such verbalization through appropriately organized debriefing sessions.

3.3.3   Further investigation
One point of further investigation for a future revision of the SE code is clause 1.06 on avoiding deceptive statements, "particularly public ones". The wording of this clause, not the spirit of principle 1, almost suggests that internal deceptions are acceptable. Perhaps supporting the view that internal participants (employees) can be treated differently, at least legally if not also ethically, from external participants in usability studies.

A different related issue one could explore might be to examine internal users in the usability lab, when their manager is in the observation room. Several of the users might be viewed struggling by their manager. This could have a subtle effect on their next performance appraisal. Do you allow managers to observe? There are many instances when managers ought to participate in the usability test. There are also well established procedures for ensuring participants understand that it is the technology not the person that is being tested (Dumas and Redish, 1999). Yet despite this, managers may (ab)use usability test results to disadvantage particular employees.

3.4   Altering Results

You have been asked to observe how junior management use new accounting software at a leading city accountancy firm. As part of informed consent, staff are informed that they will remain anonymous. As part of your observations, you notice that many of the junior management staff are making a particular data entry error when using this software. These errors are causing the accountancy firm to lose profit. Company policy states clearly that workers' salaries will be docked for clear mistakes leading to loss of company profit. Do you take the edge off the results to protect the people who helped you in the study?

> *While there are probably instances where the breaking of promises is justifiable (for example, to avoid a greater harm) in general there is a strong moral obligation to keep promises*

3.4.1   Ethical issues in this case
The main ethical issues here concern the obligations to tell the truth and to keep promises, and, again, informed consent. In this case, even more than in the previous one, it is unclear to what extent the employees could really consent. If the purpose of the research is to discover how the junior management use the software there is an obvious sense in which they cannot refuse to participate. If they did refuse, it could be argued with some plausibility that they were not doing their jobs properly. At the very least, they would feel pressured to participate. It does not follow from this that the research should not proceed, but it could be argued that because the employees are relatively powerless in this case, the employers have an added responsibility to treat them fairly. Even if they were not really free to consent, they were promised that they would remain anonymous, and what consent they did give was on this understanding. While there are probably instances where the breaking of promises is justifiable (on consequentialist grounds), for example, to avoid a greater harm, in general there is a strong moral obligation to keep promises, as we noted earlier. If we want to live in a moderately happy and well-functioning society, it is essential that most people keep their promises most of the time. We cannot have legally binding contracts for every human interaction, nor would we want this. Not keeping promises without good reason is essentially 'free-riding'. We want the benefits of a promise-keeping community but we are not prepared to play our part! This is morally reprehensible. In the case under discussion the anonymity of the participants must be honoured.

Breaking promises is closely related to lying, and is often an instance of it. (I say

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that I will do something, but I lie in that I have no intention of doing it.) Much of what has been said about promise breaking also applies to lying. There just cannot be a well-functioning society in its absence. Therefore we have a moral obligation to, in general, tell the truth. Some, for example Kant, in fact would say that this is always an obligation, regardless of any good consequences that might ensue for lying (Rachels, 1986, p. 109). This obligation, even in the weaker consequentialist sense, certainly applies in the current case. One would need to have very good reasons to present a misleading report, and such reasons are not present here. There is also an obligation to the employer who commissioned this study. In agreeing to undertake a study one is implicitly at least, agreeing not to 'doctor' the results. The researcher should tell the truth in the report, but should not reveal the identities of individuals. But what if an adverse report does have repercussions on the employees? Perhaps it can be assumed that because the employees are anonymous the report could be truthful without posing any threat to them. But this assumption might be unwarranted if the organisation is not large. There is also an issue here of the employer's treatment of employees. While it might be justifiable to dock salaries for clear mistakes, in examples like the one under discussion some care is required. If many people make a particular data entry error, the main fault may lie with the software interface and not with the employees. If so, the docking of pay would be unfair. If the fault is with the employees and not the software, there is still a problem. If the employer does dock pay when individual identities are supposed to be unknown, one of the following must obtain: (a) all junior management have their pay docked, which is clearly unjust given that not all made the mistake (at least the employer cannot know that they all did not); (b) the employer guessed which ones

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made mistakes, but this is also unjust because he may have guessed incorrectly; or (c) he had some way of inferring which were 'guilty', but then there was no real anonymity, and deceit was involved.

3.4.2   What help does the code provide?

The SE code is least suitable to the usability engineer in the area of how best to treat human participants in usability testing situations. It is not silent however. Principle 4 addresses this situation in that it says to maintain an independence in one's professional judgment. Clause 4.03, though it addresses the evaluation of software or documents, could also be applied to evaluation of participants. As such this clause says the usability engineer needs to maintain professional objectivity. Given the link of professionalism and public welfare above, and the overriding principle of public welfare in the SE code, clause 4.01 about tempering "technical judgments by the need to support and maintain human values" is also pertinent. There is also the injunction of clause 1.06 to be "fair and avoid deception in all statements".

From this one may argue that the usability engineer is obligated to report to the company but in a way that does not identify participants. Given the repeated nature of the observed error, it would seem more reasonable to report this as a problem with the interface, which is the type of observation management could reasonably expect from a usability engineer. Yet in order to preserve privacy and confidentiality this will need to be done with care. In a study such as this there may be a limited amount of internal users that could have been tested, such that it may not be difficult for inquisitive individuals to discover the identities of participants.

Altering results in the sense suggested in this case would be to act dishonestly. Such behaviour is misleading and unprofessional. Doing so would be counter the principles of an empirical study, possibly invalidating it. Yet if the usability engineer feels strongly that this is the only way forward, then perhaps the situation should be seen in the light of principle 4 on 'Judgment' and clause 4.06 on conflicts of interest. That is, the usability engineer has conscientious objections about which they ought to inform management.

The SE code is least suitable to the usability engineer in the area of how best to treat human participants in usability testing situations.

3.4.3   Further investigation

Alternatively, this may in fact be an issue of training. That is, regardless of whether this situation reflects a fault with the interface or not, these staff could be re-trained in using the product. This would need to be done in a way that the individual staff who were studied are not identified, possibly resulting in the need to train all staff who use the technology in a similar way to those identified in the study. Having identified a particular, recurring problem could lead to better training of staff in the future and show that current staff need to do some retraining in the problem area.

3.5   Privacy

You are contracted by a Web design consultancy company to interview their staff to ascertain their current knowledge. The aim of the study is to inform the company about the type of training courses they need to implement. The aim is therefore to highlight areas of overall weakness as opposed to individual shortcomings. Despite this, the type of data you collect will be able to identify individual's weaknesses. Informed consent clearly states that comments made to you by interviewees are to remain private. Following the study, a senior Vice President of the company approaches you, asking you "who did well in the study?" What do you say?

3.5.1   Ethical issues in this case

Aside from the fact that management sometimes do ask questions like this, it is not reasonable to ask this. The usability engineer needs to point this out, and should certainly not answer the question. In this instance it may be that the senior VP wants to make use of examples on video tapes (gathered for one purpose, usability testing), for another purpose. Again in this case there are serious doubts about the level of consent possible, and all of the points made previously apply. Consent may have been given for the initial video taping, but participants may not have been informed as to the ultimate audience(s) of the video. This violates not only the privacy of the participants, but also has the potential to harm the designers involved in the initial video taping session. It is worth saying a little more about privacy here. If

we could be certain that information about us would never be misused, privacy may not matter too much, but given that we cannot be sure, privacy regarding personal information enhances our autonomy. We have more control over our own lives if others know less about us. This is the real value of privacy (Miller and Weckert, 2000). If we have a moral right to autonomy (even just on the consequentialist grounds that we are the best judges of our one well-being, Mill, 142-143), a case can be made that we also have a moral right to at least some privacy. Providing an answer to the VP's question would clearly violate this right. The other issue here is that of using data for purposes other than that for which it was collected. Apart from the fact that this is probably breaking a promise (an issue already discussed) regarding the intended use of the information, the information collected for one purpose could be misleading if used for another purpose.

3.5.2   What help does the code provide?

Principle 4 on maintaining integrity and independence in professional judgment and indirectly principle 5 regarding the responsibilities of management make it clear that such a question from management, let alone answering it the way this manager would like, is not ethical. However, principally this case deals with the issue of privacy.

The SE code deals with this in a number of ways. Clause 1.06 says to avoid deceptive statements, which for usability testing in this case says that the informed consent process ought to explicitly state how the data collected will be used. Statements of informed consent should not be too vague, that is, deliberately vague to the point of being misleading or deceptive. Similarly, clause 2.03 though again addressing the 'client and employer' distinction, as opposed to the more relevant to usability engineering 'participant and employer' distinction, can be interpreted as requiring that consent should be given that is *informed* (clause 1.06) and *comprehensible* (clause 2.03 uses the word 'knowledge' in place of 'comprehension') to the participant. The italicized words informed and comprehension being 2 of the generally accepted principles for informed consent in usability testing (Dumas and Redish, 1999; Burmeister, 2001b). The usability

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engineer is responsible to adequately protect the privacy of their participants. Failing to protect their privacy, even from management within the testing organisation is a breach of the contractual agreement entered into with the study's participants.

There is a complicating factor in usability testing when video is used. While some types of data gathering such as keystroke analysis or the use of questionnaires permit relatively easy disguising of participant

> *Ethical decision making often requires balancing numerous factors. In many situations choosing between right and wrong is reasonably straightforward.*

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details, the use of video to demonstrate usability testing outcomes can make this difficult. Though voices can be disguised and video masking is possible, usability testing may be specifically looking at qualities of speech or gaze (Mackay, 1991; Mackay, 1995). If this is the situation in the above case then management should not see the video; the usability engineer has the expertise to analyze the data, respecting the identities of all involved (keeping the spirit of principle 1) and should be relied upon by management (principle 5) to do their job. This again highlights the fact that the SE code would best be enhanced for usability related empirical testing, by introducing clauses for principles 1 and 5 specific to the treatment of human participants.

An alternative could be that management should see all observations so as to be able to make an informed judgment. This alternative is not likely to be acceptable to management however, given time pressures and other commitments. In any case, the consent form would need to show that management will be viewing the videos and/or participating in the observation of participants.

3.5.3 Further investigation
As usability testing makes more use of the Internet for cost effective distributed test-

ing of, for instance, international customers with, for example, Internet banking products, future revisions of the SE code wanting to incorporate issues of informed consent could look to work done in the area of computer-supported cooperative work (CSCW) technologies. CSCW includes such technologies as shared whiteboards, chat systems, multi-player games, collaborative writing systems and email. In CSCW fine-grained information concerning individual behaviour and performance is available to a wider audience (Clement, 1993; Allen, 1993). CSCW privacy issues include equality/reciprocity (what you may see of me is what I may see of you), feedback (knowing what information about oneself is accessible to whom), group ownership of resources or information (these need not necessarily be regarded as owned exclusively by the employer), and fair information practice (including due practice and informed consent).

Another topic to explore in the area of privacy that is perhaps most applicable to distributed, simultaneous usability testing of multiple participants, is whether different types of privacy need to be considered as separate issues. For instance intrusion versus exposure, or personal versus group privacy. There may be trade-offs and priorities to consider, such as sacrificing a degree of privacy to increase security.

4. CONCLUSION

This paper has sought to identify how from an ethical viewpoint software engineering and usability engineering are inextricably linked, whilst also helping usability engineers to learn from ethical scenarios. The paper has sought to achieve this through applying the SE code to scenarios grounded in the workplace of the usability professional. This has been done with the presupposition suggested by Langford (1995) that one role of a code is to help the professional resolve potential ethical issues *before* actual problems arise, so that in similar circumstances appropriate professional behaviour eventuates. Codes of ethics are also valuable in that they are backed by the professional society, giving the principles a force that is beyond the personal obligations of the individual, empowering the individual with a standard s/he can apply

when facing an ethical dilemma. The ethics espoused in such codes relate to objective moral truths or ones relevant to the society in which that professional body operates.

Ethical decision making often requires balancing numerous factors. In many situations choosing between right and wrong is reasonably straightforward, when professionals have a good grounding in the code of conduct of their professional society. It is when choosing between right and right that professional judgment is really tested. Here is a strength of the SE code with its emphasis on *public* interest as the overriding principle. In case 3.2 this was seen to be the answer to a conflict of ethical principles; serving the public good also served the corporate good. In this situation both usability engineers and software engineers are served well by this code.

Yet in case 3.3 this still did not adequately answer the situation. Gotterbarn, Miller and Rogerson (1999b) state that the 'Public' emphasis of principle 1 is enough to resolve all situations such that all people affected by the professional's work, including the least empowered, such as the employees in case 3.3, will be shown the respect they deserve as members of the human race. However, a way forward for usability engineering would be for the 'participant and employer' distinction to be specifically addressed in a future revision of the code. Currently participants in the spirit of the SE code can be seen as potential or sample clients and therefore the client aspects of the SE code can be applied. In usability engineering the client could also be the project team to whom one is providing consulting services, further blurring the SE code's 'client and employer' distinction.

Case 3.4 could be employed to argue that the SE code is not appropriate to usability engineering because it does not adequately deal with the treatment of human participants. Perhaps usability engineers would be better served by adhering to the codes of the psychological societies or by developing their own code of ethics and professional conduct. However, there is a long established link between software engineering and usability engineering that would be better served by including usability engineering professional behaviors in the SE code. Whilst it is understood that no code seeks to be prescriptive for every situation, a more explicit inclusion of the 'participant and employer' distinction would be desirable for usability engineering (as seen in cases 3.4 and 3.5).

The privacy discussion in case 3.5 suggests that in increasingly complex information spaces, for example, distributed, simultaneous usability testing of multiple participants, computer societies should rethink privacy related issues. There may need to be a diminution of individual privacy constraints to increase security and/or permit the necessary interpersonal group functioning as is seen in CSCW.

As the ACS Standard of Conduct (ACS, 2002) concludes, so does this paper:

> In summary, a member is expected to act at all times in a manner likely to be judged by informed, respected, and experienced peers in possession of all of the facts as the most ethical way to act in the circumstances.

REFERENCES

ACM. 2000. Software Engineering Code of Ethics and Professional Practice, http://www.acm.org/serving/se/code.htm, accessed 10/10/02.

ACS 2002 Code of Ethics, http://www.acs.org.au/national/pospaper/acs131.htm, accessed 10/10/02.

ACS 2000. IT Professional Recognition, http://www.acs.org.au/news/aust-report.htm, accessed 10/10/02.

Allen, J. P. 1993. Controversies About Privacy and Open Information in CSCW: A Panel Report from CSCW'92, SIGCHI, ACM Press, Vol. 25, No 4, Oct: 40–41.

Anderson, R.E., Johnson, D.G., Gotterbarn, D. & Perrolle, J. 1993. Using the New ACM Code of Ethics in Decision Making, *Communications of the ACM,* 36(1), February: 98–107.

Burmeister, O. K. 2000. Applying the ACS Code of Ethics, *Journal of Research and Practice in Information Technology*, 32(2), May: 107–120.

Burmeister, O. K. 2001a. HCI Professionalism: Ethical concerns in Usability Engineering, *Conferences in Research and Practice in Information Technology*, Vol 1, 11–17.

Burmeister, O. K. 2001b. Usability Testing: Revisiting Informed Consent procedures for testing internet sites, *Conferences in Research and Practice in Information Technology*, Vol 1, 3–10.

Clement, A. 1993. Privacy Considerations in CSCW: Report of the CSCW'92 Workshop, SIGCHI, ACM Press, 25(4), Oct: 34–39.

Colbert, M., Long, J., and Dowell, J. 1995. Integrating Human Factors and Software

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Engineering Evaluations: An illustration with reference to a military planning system, *Proc. PACIS'95*, Singapore: 16--23.

Creyke, R. and Weeks, P. 1985. *Duty of Care: Law and the Direct Care Worker*. Canberra: Shield.

Dowell, J., and Long, J. 1989. Towards a conception for an engineering discipline of human factors, *Ergonomics*, 32(11): 1513–1535.

Dumas, J. S., and Redish, J. C. 1999. *A practical guide to usability testing*, Exeter, England: Intellect, Revised Edition.

Gotterbarn, D., Miller, K., and Rogerson, S. 1999a. Software engineering code of ethics is approved, *Communications of the ACM*, 42(10), Oct: 102–107.

Gotterbarn, D., Miller, K., and Rogerson, S. 1999b. Computer Society and ACM Approve Software Engineering Code of Ethics, *Computer*, 31(10), Oct: 84–88.

Gotterbarn, D. 2000. Thou shalt follow thy Code of Ethics – It should not be an option!, Australian Institute of Computer Ethics Conversation, May, http://www.aice.swin.edu.au/events/conv/2000_05_05.html, accessed 7/9/02.

Howard, T. 1999. Ethics of HCI, a discussion thread in the October postings of 'A professions, private Internet discussion group', Moderator: Tharon Howard, http://people.clemson.edu/-tharon/,accessed 10/10/02.

IEEE-CS. 2000. Software Engineering Code of Ethics and Professional Practice, http://computer.org/tab/code11.htm, accessed 10/10/02.

Karat, J., and Karat, C. 1997.World-Wide CHI: Future Ethics, *SIGCHI Bulletin*, 29(1), January.

Langford, D. 1995. *Practical Computer Ethics*, London: McGraw-Hill Book Company.

Long, J. 1995. Integrating Human Factors with Software Engineering for Human-Computer Interaction, *Proc. IHM'95*, Toulouse: 6–15.

Mackay, W. E. 1991. Ethical issues in the use of video: Is it time to establish guidelines? *Proc. CHI '91*, Lousianna: ACM Press, April: 403–405.

Mackay, W. E. 1995. Ethics, Lies and Videotape, *Proc. CHI '95*, ACM, http://www.acm.org/sigchi/chi95/proceedings/papers/wem1bdy.htm,accessed 10/10/02.

Mill , J. S. 1984. *On Liberty*, Harmondsworth: Penguin Books.

Miller, S. and Weckert, J. 2000. Privacy, the workplace and the Internet, *Journal of Business Ethics*, 28 (3), 255–277.

Rachels, J. 1986. *The elements of Moral Philosophy*, New York: Random House.

Rogerson, S. 1998. *Ethical Aspects of Information Technology*, London: the Institute of Business Ethics.

SCHIL 2002. Swinburne Computer Human Interaction Laboratory, http://www.it.swin.edu.au/schil/, accessed 10/10/02.

Spinello, R. A. 1997. *Case Studies in Information and Computer Ethics*, New Jersey: Prentice Hall.

Sun Microsystems, Inc. 1999. Java Look and Feel Design Guidelines, http://java.sun.com/products/jlf/guidelines.html, accessed 10/10/02.

Weckert, John, 1997. Intellectual property rights and computer software, *Business ethics: A European Review*, 6 (2), 102–109.

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