Modular approach for ethics

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Abstract: It is hard to define a single set of ethics that will cover an entire computer users community. In this paper, the issue is addressed in reference to code of ethics implemented by various professionals, institutes and organizations. The paper presents a higher level model using hierarchical approach. The code developed using this approach could be adopted easily by the entire community of computer users working in different environments. The hierarchical approach allows refinement and customization of code at lower levels to address the needs of diverse sub groups of users. It also provides comfort of flexibility as well as the potential for evolution. The work reported here is in continuation of the research reported in an earlier paper (Wyne, 2009).

Key words: ethics; hierarchy; security

1. Introduction

Computer ethics were first realized by Ramon Barquin and stated as "ten commandments of computer ethics" (Barquin, 1992). Fairweather (2004) reviewed these commandments and found some deficiencies. However, although not being complete these commandments provided a useful starting point for further exploration and definition (Fairweather, 2001). Genrally speaking ethical behavior gains significance and becomes relevant when people must enforce the laws upon themselves because of the environmental or organizational setting of their workplace (Cummings, 1993). In our everyday routine, we are all exposed to many different situations and environments that require varying "codes of ethics". For example, for business comunity, code of ethics are defined by the corporation or organization, on the other hand for academia, academic code of ethics is set up by the respective institute of education and different professional organizations also have their own codes of ethics. The reason for having all these various codes of ethics is that any one particular code does not fit into the needs of other group of users. This paper discusses various codes of ethics that are implemented by various professional organizations, and institutes and since it is obvious that some of the codes do not relate to the particular settings in which we wish to use them. It may therefore be concluded that any identified codes of ethics would not be general enough to wrap all groups of computer users and software developers. Computer technology and its application are nowadays so intertwined with any industry that any advancement in technology enforces us to revise the relevant code of ethics in order to ensure that they are still relevant to both the technology and the industry. Most computer professional understand or at least are aware of the ethics surrounding computers and their applications, because they are forced by their respective organizations and institutes. Home users and students on the other hand are the type of people that are not so aware of ethics so actually need the ethics taught to them.

However considering the negative aspects of information technology advances, we are exposed to various

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other ethical issues. For instance, major software companies have to deal with software theft in numerous ways, for example, by requiring activation of a software product by charging a fee to obtain an electronic license over the network before allowing installation of the respective software. A general understanding is that a standardized code of ethics defined for computer users needs to provide some sort of definition of what a software product is (in terms of property)? Who is its legitimate owner? And how other users may legitimately purchase this product or obtain the rights to use it? There are several ethical issues in a free democratic society and freedom of speech arguments that can be easily used to prevent the censorship of websites, thus making the existence of adult oriented websites perfectly legal and accessible to adults and even minors, although the overwhelming majority of people, would find them objectionable.

Hacking, another computer function, consists of a technique to gain unauthorized access to an account or to gather some information stored in a computer system. However, one can easily think of situations in which hacking would be considered ethical, for instance, "white hacking", in which the break in is done for a legitimate reason. Similarly, in an academic and research environment it would be ethical for someone to hack into a system just to demonstrate its vulnerability and expose security risks. This of course is without any intention of actually harming the system or the data and information stored in it. Email had a strong positive impact on professional and social communication style. It has influenced the way important information circulates inside or outside an organization. Although email has gained worldwide acceptance as a legitimate communication medium, but monitoring of email exchanges and other electronic storage (electronic monitoring) is can be considered somewhat similar to hacking, or at least when it is done without the knowledge of the individuals being monitored (Thompson, DeTienne & Smart, 1995). However in some cases it may be considered acceptable to monitor emails and other communication for example for government for the purpose of providing security to the public or preventing or solving crimes. In organizations and institutes generally email monitoring would aim to identify employees who abuse the system by sharing company secrets, harass other workers, perpetrate a crime, or merely send personal messages.

2. Application environment

While designing a standard code of computer ethics it is would be reasonable to consider different practices that could result in unethical behavior for different application areas and environmental set ups within computer application industry. Hence because of the difference in the nature of various application areas, a code of ethics that would be appropriate for academic institutions may be inadequate for the corporate world or for a home computer user. In order to build our case for developing a new model for code of ethics, we will examine each of these application environments in brief. We start with academic institutes where student honesty is an issue of great concern because student cheating is on the rise. Cheating has also become an issue of concern in online classes, both faculty and students feel that it is easier to cheat in online courses (Colwell & Jenks, 2005; Kennedy, Nowak, Raghuraman, Thomas & Davis, 2000). Academia and professional organizations such as IEEE or ACM, on the other hand, desire to share knowledge and information to facilitate learning. Therefore, it would be counterproductive if a university kept the research work of its faculty a secret. Another kind of ethical question in academia is whether it is appropriate to teach students to design computer viruses. As a purely academic exercise, this would be harmless if the virus was never actually released into a real system. In fact, it could actually be beneficial in the sense that we know how these viruses work? And how can we design defenses against them? Our

educational institutions need to teach students moral reasoning as well as educate them to make sound rational decisions about complex moral issues.

An alarming statistics about rising digital crime rates over the public networks reported by the annual Computer Security Institute (CSI)—Federal Bureau of Investigations (FBI) Computer Crime Survey, typically a barometer of computer crimes in the US. This survey gathered voluntary responses from US corporations and government agencies, reports that computer crime incidents are reaching epidemic proportions (Popuvsky, 2003). Professionals in the field other than information system handled codes of ethics in a different way. For example, engineers have a tendency to apply their own personal standards of ethics, rather than following organizational code of ethics, when making decisions about ethical dilemmas associated with their work (Payne, 2003; Payne & Landary, 2006).

Business ethics is a specialized case of computing ethics since the corporate world is probably one of the largest applications of computer technology, and certainly one where adherence to a code of ethics is critical. It concentrates on moral standards as they apply particularly to business policies, and behaviors (Raiborn & Payne, 1990). However, one major difference between business and academic environment is that corporations often have proprietary and confidential business information that must be safeguarded against disclosure to their competitors as well as the general public. In reference to security and ethics, an important ethical question that needs to be addressed by firms making excessive use of computer technology is to handle the confidential information that is sent to them by their customers over the internet. An important aspect of that is not present in a more traditional commerce is the long distance and somewhat anonymous nature of transactions over the internet make it possible for anyone to impersonate individuals or institutions. A code of ethics for such business environment would need to address all of these issues and scenarios.

Finally we come to a group of computer users that is using computer for personal pleasure or business namely home users, being the most difficult areas to address. Although this is one of the user groups for which ethics are probably most important but there is really no way that we would be able to enforce adherence to a code of ethics. In addition, most home users are probably unaware of security and ethics issues in general and probably do not have a sophisticated line of defense against intrusion. Although this may be changing in recent years as security protocols become more common and more importantly are now part of the standard package of service provided by many ISPs (Internet Service Providers).

3. Analysis

The corporate workplaces, software development companies, academic institutes and professional organizations, all work with a code of ethics. Study of these individual codes of ethics leads to an interesting observation; the computer ethics codes created for these individual categories are not exactly the same and ethical codes in one user group are not applicable to other target areas. In an effort to determine whether a code of ethics laid down by one organization or institute will fit into a similar organization or institute we analyzed code of ethics implemented by various academic institutes. We looked at various universities within the United States and found that a few of the universities did not have any ethical code available or was not easy to find using the websites search engine. For some, there was little or no consistency in the manner in which the codes of ethics was presented to students, faculty and staff. Another interesting observation was that the codes were not quite similar and were not complete either, although there was significant overlap in some cases. One would think, on

the other hand, that corporations would definitely have more structure and consistency in their ethical code's content. However while reviewing several companies, it was found that there were many inconsistencies, as well as ethical codes were difficult to locate. The companies we looked at ranged from being very similar in type to being very different in type but somewhat similar in size. Another problem with the codes was that it is very difficult for an individual to reference something quickly. Although there are inconsistencies and shortcoming among many of the codes evaluated, almost all the codes that were studied had some overlap with one another. Each code state the same thing differently, such as one may be right to the point and the other may explain the statement and provide examples. Depending on the type of business or corporation, there were also statements that would only apply to their particular area of application.

We conducted a survey to collect data from a wide spectrum of computer users in an attempt to determine if there is really a need to develop a general code of ethics as well as to assess the need for providing a mechanism for educating users in computer related ethical issues. This survey consisted of 15 questions and was distributed initially to over 700 individuals with the request that they forward it via email to any other people they thought might be interested in filling it out. Their responses were collected via the internet and stored in a database. For details of the survey questions and responses readers are referred to (Wyne, 2009). Nearly all of the respondents stated that they had some sort of general code of ethics to follow. Nearly one-third of the people surveyed did not have or did not know if they had a set of computer ethics available to them. Several indicated that the computer code of ethics seemed really to be nothing more than the acceptable use of computer equipment policy within their corporations or institution. Many also indicated that the computer code of ethics targeted typically internet usage, protection of corporate assets and email exchanges. A review of the comments received concludes that ~~their~~ information systems management organization maintained a computer code of ethics while the human resources department of other organizations maintained the general code of ethics. There were also several indications that the general code of ethics broadly covered the computer code of ethics but the individuals did not see where it may be beneficial to separate them. For the individuals surveyed with multiple codes of ethics supplied to them, a large percentage stated that the computer codes of ethics overlapped with general or other codes of ethics provided to them by their respective organizations or institutes. Most indicated that the codes were located on internal web sites (as expected). However, a few did indicate that they were provided hard copies as a backup if the internal website was down. There was also an indication that codes of ethics provided were clear, but in many cases the code of ethics available to users were very long and particular information was sometimes difficult to locate. A majority of the people agreed that their codes of ethics were indeed adequate to meet their requirements. Many of the respondents did not know when the codes were last updated, whereas about the same number of them said they had been updated somewhat recently.

4. Modular approach

One big problem in addressing ethical codes is that it is difficult to document a complete set of ethics while maintaining a manageable and readable document. Plato had once said that good people do not need laws to tell them how to act responsibly, whereas bad people will find ways around the laws. Due to the rampant growth of computer systems and information technologies, it is possible that individuals will not be adequately trained in computer ethics. Many people with limited experience and education may therefore be not fully aware of the consequences of their actions and not know that their action is unethical. One would then have to ask whether that

is truly the fault of the individual since they were unaware of possible outcomes of their actions or is it simply the fault of the IT community for being negligible in the area of computer ethics education. It is our vision that there should be a standard set of ethics available to all individuals for the purpose of education and easily accessible in the event that they encounter some form of ethical dilemma. This ethical code would need to be available to wide range of individuals, including those active in academia (either as students or faculty members), corporate world, or even those that are using computers within their own home. In addition the new code of ethics must also be readable, easily accessible and be consistent. These three constraints are important in order for computer users to become knowledgeable in computer ethics, regardless of their primary area of experience in using computers.

It is probably unrealistic to think that any one code could contain ethical guidance for every user group and at the same time be readable enough for an individual. If we were to modularize the codes a bit, the targeted area could potentially manage their own module. Since developing, a universal code of ethics that encompasses every user group would be a difficult and daunting task for any one group. However, it is possible to subdivide this code into smaller and more easily manageable modules and would make it more likely a standard ethical code that is easy to maintain. This modular structure utilizing hierarchical approach would be easy to update and keeping the code current as the underlying technology of computer systems evolves. Creating a centralized standard code with user group specific modules will reduce the redundancy of the existing codes. In addition it will also provide the flexibility and the ability to evolve the existing code of ethics and remain current with the advances in computer technology. This modular approach for developing and maintain code of ethics is analogous to the concept of hierarchy and inheritance from object-oriented programming. Using this analogy, the common top level statements (module), in the standard code of ethics will be similar to base classes and once defined will be essentially static. In contrast, the user group specific statements (modules) will be similar to classes derived from the base classes. The modules relevant to specific user group will draw more general ethics guidelines from the base module through inheritance. These lower level modules or statements would be dynamic, being maintained by different organizations and institutions themselves and frequently modified to reflect the current situation within the industry or outside factors.

5. Conclusion

The survey results, as well as our research of the existing codes, support the conclusion that there is not only a wide diversity in the existing codes of ethics but that there is much redundancy and overlapping material in the various codes as well. This paper proposed to establish a common set of ethics for all categories of computer users. This common set considered as a top level (module) code of ethics, would be essentially static universally adopted and maintained by an organization such as ISO (International Standards Organization). Each user group would further refine the statements found in the top level code and customize them to be relevant to their particular set of circumstances at a lower level module. These user groups would be responsible for the frequent review and possible updating of their module to keep it current. It is entirely possible that there could be more than one level of specialization below the common top-level statements providing as fine a granularity of customized ethics statements as would be necessary to make the code relevant to its users. Finally, portals through which home users access the Internet could be responsible for providing access to this ethics code through their ISP interfaces, thus facilitating home user education in ethics. In future we intend to explicitly layout these statements for codes at each level of hierarchy.

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