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Introduction

Information Systems technology promises to transform our world. The pertinent ethical question is whether that transformation will be for good or for ill. Who will make the decisions, and upon what basis? Who will benefit? Who will be harmed?

As computers and the software programs they run become more pervasive in modern life, there is a growing apprehension of the potential harm they can cause and an awareness that, in America, the professionals and semi-professionals whose programs influence our lives are a non-regulated, non-certified group, in large measure not bound by any code of conduct beyond their own conscience. Hence there are moves afoot in the United States and Canada (Gotterbarn, Kerr) to legislate formal licensing and certification for Information Systems (IS) professionals. Unless national and international professional associations are able to police their own members, society at large may seize the reins. For professional, political, philosophical, and economic reasons, it is preferable to institute measures of self-governance. This paper surveys an eclectic literature in order to provide a framework for future research developing a system of professional ethical training and a self-governance system.

Conceptual Framework

Is the study and practice of ethics important to IS professionals? Is there a need for an Cyberethic? Does moral choice exist with regard to technology? What is the general typology of the field of ethics? What are some current areas of Cyberethics investigation? What are key issues in IS that require ethical clarification?

Professional Ethics

Three definitions of professionalism were reviewed. The first, per Larson (1977), is that of a "paradigm" or "ideal type". This focuses on a group recognized by society as a profession, then compares that group to the characteristics of others. The group most commonly used is the medical profession's characteristics of theoretical knowledge, long training, specialized skills, licensing, autonomy of action, occupational associations, and code of ethics.

A second approach is the "exchange-structural" or functionalist view that focuses on one essential characteristic of a group, then derives a group of associated characteristics. According to this view, the public recognizes that the services provided are based upon knowledge so specialized and esoteric that a special sub-group of society has been delegated to provide them. This approach requires a code of ethics as formal demonstration of the service ideal and also as a means by which the actions of the professionals are policed. (A. Flores, 1982)

A third approach to identifying professionals is emerging as public trust in professionals is eroding. This view is known as power theory and begins with the concrete interests of the occupational group. This group seeks the benefits associated with the title "professional" and undertakes those steps necessary to obtain the title. The relationship with society is political and ideological. Although power theory holds that professionals are governed by self-interest, it also holds that a code of ethics is of central importance in creating a favorable public impression.

While all this may indicate the need for a Code of Ethics in creating or maintaining professional status of an occupation within a society, *none define ethics*. Further, it presupposes that there is the possibility of ethical choice with regard to technology. This idea is not without opponents.

Is Choice Possible?

The relationship between science, technology, and society has been described three ways.

In Linear Development, science leads to technology, which in turn has an essentially one-way impact on society. Technology is predominantly beneficial with little government regulation or public policy choice needed.

Technological Determinism has many degrees and types, but characteristically, it views technology as an autonomous interlocking system which develops by its own inherent logic, extended to the control of social institutions. In all versions, science is itself derived primarily by technological means. Usually determinism and pessimism are shared viewpoints.

Social and political forces affect the design as well as the uses of particular technologies. Technologies are not neutral because social goals and institutional interests are built into the technical designs that are chosen

Only within the Contextualist view is there the possibility for ethical choice..

Topography of Ethics

As described by Kenneth Goodpaster (1991) ethics is divided into three fields: descriptive ethics, normative ethics, and meta-ethics. Descriptive ethics is not a philosophical activity, *per se* . It is more appropriately classified among the social

sciences since it aims at an empirical or neutral description of the values of individuals or groups.

Normative ethical inquiry seeks to develop and defend judgments of right and wrong, while meta-ethics is concerned with examining questions about the meaning and provability of ethical judgments. Normative ethics is sub-divided into two subgroups: moral common sense and critical thinking. Moral common sense is a system of ethical values, or rules of thumb that guide decision making. Critical thinking is the search for criteria that will justify the inclusion or exclusion of common sense norms, clarify the applicability in certain circumstances, and resolve conflicts among them.

There are three normative views, the most influential of which is Utilitarianism. This view prescribes that moral common sense is governed by the goal of maximizing net expected utility (or happiness, or pleasure, or welfare) for all parties affected by the decision.. there are many problems raised by this approach to ethics, but this is the closest approach to something resembling a scientific empirical method.

Contractarianism, in contrast, anchors moral common sense not in utility, but fairness. Fairness is the condition when all participants are accorded equal respect. Contractarian ethics often directly counter utilitarianism.

The third approach to critical thinking is Pluralism. This is the most widely held view. Under this view, the governing principle is duty, distinct from extrinsic concerns such as consequences or rights. Fidelity and honesty, for example, are moral obligations not because they lead to more utility or because others have a right to expect them; they are just basic duties.
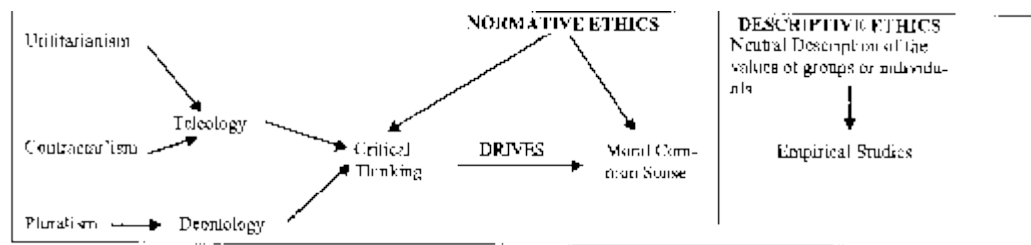
Current Cyberethics Research

Current research in Cyberethics generally does not involve critical thinking and focuses on empirical studies of descriptive ethics. As such, it measures the outcomes or effects of popular Moral Common Sense in making ethical decisions and determining conducts.

Leventhal, Instone, and Chilson (1992) reveal that gender and technical expertise potentially influence responses to ethical issues. Susan Athey's study of the differences between the ethical beliefs of experts and college computer science students was not able to confirm the linkage to gender, but found that high technology students have significantly different ethical opinions than experts and suggests some possible reasons. Kidwell (1987) found that persons with more experience have different ethical beliefs

than college students. These seem to show a dynamic and on-going development of ethical attitudes as people gain technical experience. The important implication is these differences can be used as beginning points for ethical awareness training. The question is left open as to how these attitudes develop over time and upon what foundations they are built.

Because descriptive ethics focuses on the product of popular moral common sense, it seems appropriate to investigate several current issues of Cyberethics from a normative, Critical Thinking perceptive.

Critical Issues

Some of the ethical issues of concern here are automation with its net loss of jobs, managerial control, de-skilling, labor-management relations, restructuring of work, the impact on employment opportunities, health implications of computer use, isolation of workers, electronic monitoring, gender-bias of the computer elite, the effects of computer-enabled de-centralization on career structures, privileged access to information, which is an issue of justice and societal participation. Computer modeling raises some significant questions, due to the simplifying assumptions that reflect programmer biases and variable selection. Also as yet unresolved is the question of legal responsibility for damage done by faulty software, as is the role of artificial intelligence in society, the ethical use of software for military applications, and many others.

	Utilitarianism	Contractualis	Pluralism
Personal			
De-skilling	+	-	-
Health hazards	+	-	-
Isolation	+	+	-
Job Displacement	+	-	-
Career			
Gender Bias	?	-	-
De-centralization	+	?	?
Restructuring of Work	+	+	?
Labor-Management			
Electronic Monitoring	+	-	-
Control	+	-	-
Technology			
Automation	+	-	-
Role of AI in Society	+	-	-
Military Software	+	-	-
Modeling Bias	+	-	-
Society			
Lack of Privacy	+	-	-
Privileged Access	-	-	-
Information Gap	-	-	-
Software Liability	+	-	-
Intellectual Property	?	-	-
Cultural Imperialism	+	-	-
Ethical Views of various critical IS issues			

Conclusion and Implications for Future Research and practice

Information professionals develop their ethical as a part of their professional lives. It is in this context that the professional associations to which they belong become important sources of instruction. Oz (1992, 1993) makes a coherent case for a single code world-wide. How should such a code be developed?

Deborah Johnson (1985) suggests that professional codes of ethics should be examined along obligations to society, to employer, to clients, and to colleagues and professional organizations. This call to a hierarchy of duties is typical of a pluralistic (Deontological)

ethical framework. Indeed, it is noteworthy that in many European countries, professional ethics code for IS contains a variant of the word "Deontology"

Friedman and Kahn (1994) in addressing the need to educate computer professionals to ethical issues, base their appeal on the fact that computing supports basic freedoms, responsibility for technical work, safety in the workplace and access to the disenfranchised. This is clearly Contractarian ethics.

Kerr (1994) writes that the Canadian Information Procession Society and the International Programming Guild are working to promote professional ethics in part by certification at the provincial level, much like medical professionals. This attention to the public welfare could be categorized as a utilitarian ethic.

Into the vortex of this is issue, add the dynamic nature of computing , the push by manufacturers to lower barriers to users, by providing easier to use, more sophisticated and powerful tools. In a strange paradox, the manufacturers broaden the pool of computer 'semi-professionals' thereby undermining the position of the professional organizations and their power to suggest ethical norms.

Donald Gotterbarn puzzles "there are clearly many devices that have had a significant impact on society over the centuries. The invention of the printing press was a pivotal event in the history of the transmission of culture, but there was no Printing Press Ethics. The locomotive revolutionized the transportation industry, but there was no such thing as Locomotive Ethics... Why should there be any such thing as Computer Ethics?"

I think if the manufacturers had dropped the price of locomotives to less than one-tenth of one percent of the original price, "Everyman" might be able to afford one. If then the government and industry put down millions of miles of track leading virtually everywhere, "Everyman" might see the potential in ownership. If there were also no licensing provision to putting one's own locomotive onto the tracks nor penalty for causing harm, "Everyman" might cause a great deal of trouble. And I suppose we might have been forced to create Locomotive Ethics. More likely, we would pass comprehensive law.

References available from the author upon request.