

**A Prolegomenon to Information  
Technology Ethics**

**by**

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When a company talks about using information technology to "reengineer", it often means that a significant number of employees will be terminated as work flows are redesigned to achieve higher levels of efficiency [Hammer and Champy, 1993; Cafasso, 1993 ]. When the FBI urges Congress to require telephone companies to install special devices to track on-line phone setups (the transaction information describing who is calling whom), many believe that the FBI is creating the ability (as well as the perception) to conduct very large scale phone monitoring for unspecified purposes, thereby chilling political discussion and association [Markoff, 1993]. When millions of individuals copy software, they create a \$2.4 billion shortfall in revenues to the software industry, which may threaten the development of new software, force consolidations in the industry as profit margins fall, and encourage the growth of software oligopolies [Software Publishing Association, 1993]. When companies announce that they will search each person's computer on company LANS looking for unauthorized (and potentially illegal) copies of software, and perhaps monitoring e-mail files in the process, they are treading on the expectations of privacy and integrity which many consider necessary to their personal dignity [Stahl, 1994].

These situations are illustrative of the individual, organizational, political, and social ethical issues which are now commonplace in the information systems arena. While these issues appear to be raised by and involve information technology, they really concern the uses to which information technology is put by key actors--individuals, organizations, politics and societies.

Yet despite the explosion in information technology in the last 20 years, scholars, students, and practitioners would be hard pressed to find answers or even methodologies for arriving at answers in the IT ethics literature. There is an ethical vacuum in cyberspace

[Couger, 1989]. There have of course been pioneers who have explored the outer fringes of the territory called IT ethics [Johnson, 1994; Dejoie, Fowler and Paradice, 1991; Forrester and Morrison, 1990; Khalil, 1993; LaChat, 1986; Lewis, 1993; Mason, 1986; Oz, 1992;1993; Parker, 1990; 1983] , but no systematic literature has emerged as one finds, for instance, in business ethics [Donaldson and Werhance, 1993] , medical ethics [Fletcher, 1990] , or legal ethics [White, 1990].

There are four difficulties with the existing IT literature which we explore and seek to address in this essay. First, with some exceptions, the nascent and early IT ethics literature is not well grounded in the classical or contemporary theories and language of ethics [the exceptions here is Johnson, 1994; and Cohen and Cornwell, 1991]. Some fundamental concepts of ethical behavior and description are therefore missing. Second, the early literature is often a response to pressing social problems and there is a resulting social crisis mentality calling for immediate, often legal, action. The attention paid to individual software theft through copying, system failures, "hacking," security lapses and the like give the IT ethics literature a disorganized topology [Ottensmeyer and Heroux, 1991]. Often, the literature reflects a particular bias towards the problems of powerful groups such as the concern for IT worker moral choice as opposed to concern about management and organizational ethical choices [Kling, 1991; Kling, 1980]]. As a result, we have no map of the IT ethics domain which identifies major land masses, compass directions, levels of analysis, or recommended pathways to get from point A to point B. We need such a map to guide practitioners, to guide future research, and to illustrate for our students the issues they will surely face in the near future.

Third, the literature has a highly atomistic, and individual orientation which focuses on what individual IT employees, managers, system designers should do. There is little in the literature about the qualities of a "good" or "ethical" IS group, organization, or the political uses of IT or consideration of an ethical IT-intensive society. Last, the existing literature is neither normative or prescriptive. There are few answers offered to the

questions, "What should I do, what should we as an organization do, what laws should we have, what social norms should we encourage?" Instead the literature often merely catalogs situations and offers up situational ethics without any general principles to guide us, and without suggesting a methodology. Often practitioners are advised to consult some professional code, of which there are at least four, and which often give contrary advice [Oz, 1992; 1993; Parker 1988].

We cannot of course in this single essay thoroughly address all these issues. But we can make a start by identifying key concepts in the classical and, more important, the contemporary ethics literature; develop a map of the ethical landscape based on key ethical dimensions; apply some of those contemporary concepts to the IT domain; and attempt to develop a prescriptive methodology for arriving at ethical rules (and hopefully consequences).

## I. Basic Ethical Concepts Which Define A Moral Space

Ethics is about the decisionmaking and actions of free human beings. When faced with alternative courses of action or alternative goals to pursue, ethics helps us make the correct decision. Ethics helps provide answers to questions like "What should I do, what should we do, what goals should we pursue, what laws should we have, what collective behavior should we all pursue?" Ethics then is about practical decisionmaking and human behavior in the broadest context. Ethics is the premier social science and encompasses sociology, economics, psychology, anthropology and history. It is above all about what is good and what is evil, and how we come to make such judgments [Hare, 1952; Moore, 1986].

*(a) Major Schools of Classical and Contemporary Ethics.* There are two thousand years of organized literature concerned with ethics and it would be presumptuous to attempt a review [See Moore, 1986]. Nevertheless, there are at least three critical distinctions in the literature which can be used to organize the literature, situate one's analysis in that

literature, and of which IT ethicists should therefore be aware. These distinctions are: (i) phenomenology vs. positivism, (ii) rules vs. consequences, and (iii) individuals vs. collectivities. Figure 1 describes these dimensions and places major ethical schools or scholars in their respective areas.

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### Figure 1

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Below we describe briefly each distinction, and then describe the intersection of these dimensions which form schools of ethical thought.

(i) Phenomenology vs. Positivists. In answer to the question "What should I do", the ethical literature divides along a dimension of "givenness" as opposed to empirical observation and discovery. For those ethicists that can be called phenomenologists, what is good is given in the situation, derived from the logic and language of the situation, or from dialogue and debate about "goodness" per se. Positivists, on the other hand argue that we should observe the real world and inductively derive ethical principles.

(ii) Rules vs. Consequences (deontologists vs. consequentialists). Ethicists that are in the deontological camp believe good actions result from following the correct rules of behavior, which generally are thought to be universal and applicable to all. These rules are based on religious beliefs, intuition, or aesthetic belief. Consequentialists, in contrast, believe that general rules are not specific enough to guide action, and feel instead that we must look to the consequences of our actions, and take those actions which produce the best results or consequences.

(iii) Individuals vs. Collectivities (micro vs. macro levels). Ethicists differ on the locus of moral authority even as they agree individual decisionmaking is the proper subject of

Figure 1 A Typology of Ethical Theories

	Rules	Consequences
Collectivity (macro)	(1) Collective Phenomenologists	(3) Collective Consequentialists
Individual (micro)	(2) Individual Phenomenologists	(4) Individual Consequentialists

Phenomenologists                      Positivists

ethics. Some argue that moral authority is located in the individual who through self-analysis and reflection comes to develop a set of rules, or engages in an analysis of self-interest. Others argue that moral authority must be located in larger collectivities -- the organization, society or polity. Both positions carry risks. The former allows individuals to set their own rules, their ethics, regardless of society. The latter introduces a potential moral relativism of a different sort: whatever the group believes is best becomes the rule.

We argue here that much of much of classical and contemporary ethical thought can be arranged in the space created by the intersection of these three dimensions, and that four distinct schools of ethical thinking can be derived. Because most if not all rule-based ethics are also phenomenological (i.e., they depend on "given" or logical rules) and because most if not all positivists are also consequentialists, we have collapsed these two dimensions together.

*School 1. Collective phenomenologists.* This school argues that we should follow rules of ethical behavior and that these rules can be derived or do in fact derive from the logic of the situation. These rules are species-wide and apply universally. Socrates and Plato [1957; 1957] began the debate by positing that "goodness" itself was a form or concept -- just like "chair" or "table" -- that could be described and approached by humans even though it could never be perfectly grasped. The point of ethics was to discover, through dialogue, literature, and language, the nature of goodness, and, once understood, to base actions and goals upon it. Kant [1956;1963], and many others to follow, followed a similar line. For Kant, the world of "phenomena" was entirely based on species-wide categories of human understanding -- categories of pure reason, like cause and effect, time, and order. The "real" or noumenal world could never be directly observed. Kant believed that the right course of action would be consistent with pure reason, and the wrong course of action a violation of reason, a contradiction. For instance, for Kant, the answer to the question "Should I throw beer cans on the road as I drive along," would

obviously be "No" because if everyone did this it would be impossible for anyone to drive along the road. It would lead to a *reductio ad absurdum*. This reasoning forms the basis for *categorical imperatives or rules* such as "Thou shalt not throw beer cans [or any cans] on the road." For both Plato and Kant, the rules of good behavior were collective, species-wide, and invariant to consequences.

*School II. Individual phenomenologists.* This school argues that individuals shall come to know what is right by looking inward to universal and timeless rules derived from their religious belief, intuitions about "rightness," and self analysis. For this group, ethics is based on universal duties applicable to all [Ross, 1969], religious precepts such as Hebraic, Christian or Islamic ethics [Saint Augustine, 1962; St. Thomas Aquinas, 1962], intuition [Ross, 1969] and self analysis [Gauthier, 1970]. Many forms of religious ethics, although collective in intent, nevertheless involve the individual perceiving a relationship to god and are therefore individualistic in practice.

*School 3. Collective consequentialists.* Schools 3 and 4 differ from groups 1 and 2 in that they tell us to look about in the real world to discover empirically what is right and wrong rather than rely on rules supposedly "given" in the situation. The collective consequentialist school begins with Aristotle [1970; 1985] who argued that we should study the actions, laws and mores of different peoples and cultures and inductively arrive at a universal database of good acts, laws, and mores. The most powerful positivist position is that of the utilitarian John Stuart Mill [1965] writing in the 18th Century. Utilitarianism advised us to take those actions which provided the greatest pleasure for the greatest number. Utilitarianism is based on empirical observation (what does in fact work and lead to the greatest pleasure), on consequences rather than absolute rules, and on the broader collectivity or community--what is good for everyone. Utilitarianism tells us to not follow rules blindly, but to maximize the pleasure or welfare of all.

A great deal of contemporary ethics of the last twenty years can be found in this portion of ethical space -- the union of positivism, consequentialism, and macro or collective analysis. Contemporary theorists have extended classical utilitarianism by moving away from hedonism and pleasure, instead focusing on social contracts and communities. *Contractarians* like Rawls [1971] argue that society could be seen as originating in a social contract in which free individuals chose principles of justice behind a "veil of ignorance" that prevented them from knowing their own position in society. Under these circumstances, free people would create a society in which to protect themselves against worst outcomes, they would insist on (a) the maximum amount of liberty consistent with like liberty for others, and (b) a distribution of wealth in which the worst off would be as well off as possible (the maximin principle). Based on these assumptions about the origin of society, Rawls argued for those actions which empirically were consistent with the origins of society, e.g. maximized liberty for all and distributed wealth (and other good things) according to the maximin principle. The consequences of actions for the collectivity are decisive for Rawls and others in the contract tradition. Other theorists in this category are *communitarians*, who ask us to take those actions which satisfy the preferences of all [Green, 1994], and *stakeholder analysts* [Carroll, 1989; Freeman, 1984], who ask us to act impartially by taking into account the perspectives and interests of all, balancing those interests, and ultimately satisfying all interests to at least a minimal degree. <sup>1</sup> Most commentators who have focused on ethics in various professions such as law, medicine, and IT, and who recommend that professionals follow a collectively derived code of ethics fall into this school as well

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<sup>1</sup> The ethics of R.H. Green (1994) poses a problem for this analysis because he suggests we seek rules (and hence belongs in the rule based camp) but that these rules should be derived from empirical analysis of the consequences of various possible actions. I have classified him as communitarian consequentialist because of his emphasis on a society wide consensus empirically understood if not actually the result of a vote, and because of his strong stakeholder bias--the omnipartiality which he calls for.

because the collectivity--the profession--is the source of ethical advice and direction. The Hippocratic oath which, among other recommendations, argues that doctors should at least do no harm, is a kind of stakeholder analysis where the key stakeholder is the patient, and where the right action depends on an empirical analysis of the situation. We shall turn again to these contemporary theories in Section III.

*School 4. Individual consequentialists.* A very different kind of positivism is rooted in individual levels of analysis. Theories of institutional economists such as Adam Smith argue that social welfare -- at least in an economic sense -- is best served if each individual through analysis and experience discovers his or her best selfish interest, and then pursues that interest to the full. Here, good acts of individuals in any specific situation are those which have good consequences like contributing to social welfare, and these good acts are found by empirically examining one's situation, calculating one's options for maximizing personal wealth, and pursuing the best option. The competitive market--the "invisible hand"-- with its price mechanism, enters deus ex machina to resolve individual competition into collective maximum social welfare which benefit all [see also Gauthier, 1970].

Writers and scholars who focus on IT ethics typically fall into the school of collective consequentialists when they take ethical stands at all. Indeed, most writers on IT ethics build models of the decisionmaking process, empirically gather data on what rules people follow, or analyze some issue --like privacy--rather than come up with any ethical advice. Yet the strong bias in the literature is the following: when faced with an ethical decision, the individual should consult some larger collectivity -- the person's firm or professional society -- for advice and to follow that action [Parker, 1988; Johnson, 1994; Neumann, 1991]. Among the Internet aficionados, there is a strong libertarian ethic which argues that individuals should be able to "do what they want, when they want" and that the collective social welfare is advanced by the pursuit of a kind of minimally organized anarchy [Sterling, 1992]. In its moderate form this libertarian argument is a

market based, individual consequentialist position, but when carried to an extreme this argument may fall out of the ethical space we have described and turn into an amoral free-for-all with no connection to the collective social welfare.

*(b) Unifying themes.* While ethicists have many differences, there are also unifying themes. Most classical and contemporary ethicists argue, for instance, that ethics involves the choices of free people, who are informed and rational. All agree that under these conditions, individuals are responsible, accountable, and liable, and that a good society is one in which due process obtains, that is, there is a fair and impartial process exists for determining responsibility, accountability and liability. These are not empirical matters to be discovered, but rather the logical conditions required for there to be any ethics, or debate about ethics, whatsoever [Johnson, 1994 , chapter 7].

In general, ethicists do not admit the argument of "just following orders" as an excuse for unethical individual acts. Neither do they admit "forces of history" or other exceptions to accountability. There are no ethical "invisible hands" in the moral marketplace which relieves individuals of responsibility for their actions, and all action must be attributed to human agents. For IT ethics these unifying themes are very important, as we describe below, for they mean that it is morally unacceptable to claim you acted, or something happened, "because the computer did it" or "the computer told me to do it."

*(c) Limits to ethical behavior.* Can good people take bad actions? Can good organizations commit unethical acts [Gellerman, 1986]? How can these events happen if the correct process and method of ethical analysis is in place and used? Scholars have begun to realize empirical limits to moral behavior. Among these limitations are (i) a bounded moral rationality which limits the precision of calculating "best outcomes," [Donaldson and Dunfee, 1994], (ii) uncertainty in which new situations require different

responses from the past, (iii) situational specificity in which each situation is so unique that the existing set of rules is inapplicable, and (iv) opportunism caused by other actors "gaming" the situation, taking extreme positions which do not reflect their expected outcomes (especially harmful to consequentialist positions). Many of these limitations are the same as those posited in transaction economics [Williamson, 1985] and the similarities are deliberate insofar as the moral contractor faces the same limitations as the economic contractor.

For an IT ethics these are important considerations. They suggest for instance that good people, and good organizations, following good procedures, will nevertheless make mistakes, perhaps the more so as technological environments are uncertain, and new situations so commonplace. Nevertheless, individuals and collectivities remain accountable and damages may be assessed for mistakes under these conditions.

*(d) The tension between individuals and collectivities.* Is it possible for people to be ethical and good in an evil society, or an evil organization? What is the ethical meaning of the statement "He [She] was a good Nazi" or "She [He] is a good chess player?" Should a person follow "bad" or "evil" laws? Are all Americans now living responsible for the atrocities committed by American forces in Vietnam? Should individual white males pay reparations to individual white females in the form of jobs and wages to compensate for past discrimination against the group of white females?

Each of these difficult questions reflects the ethical tension in all ethical thinking between the individual and the larger collectivity--the group, the organization, the society. For the most part, the ethics literature uses a language appropriate to biological, living, individual, human beings. This language is not easily transferred to larger collectivities. For some ethicists, all rational "formal organizations are not moral persons, and have no moral responsibilities, they have no moral rights" (Ladd, 1970;) and "there is one and only one responsibility of business....to increase its profits [Friedman, 1965; 1970]. The

language of ethics in this view does not apply to organizations any more than it applies to, say, the game of chess and its players. For others, formal organizations are moral persons not merely because they are the subject of rights but because formal organizations act with intention and in accordance with a formal, corporate decision structure (French, 1979). Any organizations which meet the criteria of what is known as a "Davidsonian agent" -- an intentionally acting entity -- are therefore moral entities which can be held responsible and accountable. Mobs and statistical groups, in this theory, are not moral agents. In this view, the statistical aggregate, "white males", may not be held responsible, accountable or liable for past discrimination against another statistical aggregate, "white females." In contrast, an entity like the United States government could be held responsible for the actions of its agents now or in the past because it fits the criteria for a Davidsonian agent [Davidson, 1971].

The tension between individuals and groups is especially challenging for School 3 - the collective consequentialists. This school is critically dependent on the larger collectivity providing guidance to individuals. But if the collectivity is evil, how then should individuals proceed? Reliance on "professional codes of conduct", which may themselves be corrupted by professional self interest, pose significant problems which we address in Section II.

*(e) The situation of information technology.* What is the moral significance of such statements as "Computers flatten hierarchies," or "Computers eliminate the need for middle managers" or statements of the form "Computers do X" where X is any social consequent? From an ethical point of view, these statements are amoral because they substitute impersonal forces--technology--for human agency. This way of thinking and speaking removes human agency from the events described. The actor in such sentences and thinking becomes an impersonal, non-moral force, which acts on society presumably without human intervention. But are such assessments empirically correct? If so, we have

a difficult situation: a real empirical world which is inherently amoral. But as it turns out, there is little support for these assessments in the area of information technology or any other technology in human history.

An ethics of information systems is impossible without an understanding of how information technologies affect human choice, human action, and human potential. Societies do not stand naked before technological change, swept along before the tide, as some popular journalists intimate. Historically, societies react to technological change by mitigating its influence, civilizing the change, compensating injured individuals, attempting to restore balances struck over centuries. For instance, one major response of all industrial societies to vast increases in productivity brought about by modern technology has been to reduce the work week from over 60 hours in 1900 to less than 40 hours in 1990 [Leontief, 1986]. Broadcast technology was tamed and regulated by the Communications Act of 1934. Technology, in other words, does not stand "outside" of society, acting upon it, but instead technology--its manufacturers, benefactors, users--is a social phenomenon itself subject to all the constraints of other social actors. Among these constraints is the notion of social responsibility: you can and will be held accountable for your actions.

Critical to our ethical understanding is the realization that information technology does not impact society like some iceberg colliding with a ship at sea on a stormy night [Laudon, 1974]. Rather, more than twenty years of research on the relationship between organizations and information technology has established that there is a two way relationship between information technology and organizations and society (Laudon, 1974; 1986; 1994; Kling, 1974; King and Kraemer, 1986; Orlikowski, 1992). On the one hand, IT confronts individuals, organizations, and societies as an "objective" reality, providing obvious opportunities for action and constraints on its use at a particular moment in history, in a particular society. Organizations must cope with, adjust, adapt to these realities in order to survive. On the other hand, IT is a socially enacted phenomenon both in its design, use, and implementation. There are significant and meaningful

voluntaristic--"subjective"-- elements of information technology. Social actors make choices--sometimes alone and sometimes in larger macro cultures like trade associations, industry alliances, governments, and professional groups-- about what goals the new technology will pursue, what meaning the new technology has, how it will be implemented, and what ethical, social, and political consequences are tolerable, moral, and acceptable.

Empirically, just about anything can happen when computers are added to organizational life. Empirical research finds that computers can become icons or practical tools, can aid the existing workforce or decimate it, can expand the cognitive content of work or shrink it, can decentralize organizations or turn them into well articulated and micro-managed hierarchies, and can add to productivity or have little impact [Laudon, 1994]. Whatever result occurs is empirically the result of managers and other human beings who participate in a decisionmaking structure.

Given these basic concepts of classical and contemporary ethics, what can we recommend then as a beginning to specific IT ethics?

## **II. A Descriptive Map of Issues and Levels**

To develop an ethics which is uniquely applicable to the IT arena requires that we (a) map the unique issues and situations which are effected by IT, (b) propose some methodology which can be applied to these issues and situations, and (c) address the tensions between individuals and collectivities.

Figure 2 illustrates the IT ethics map we propose. There are two elements to this ethics : (a) a descriptive map of the ethical landscape, and (b) a community-based theory of social contracting which generates rules of conduct appropriate to all situations at different levels faced by all moral agents. We describe the normative theory in the following section III.

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Figure 2

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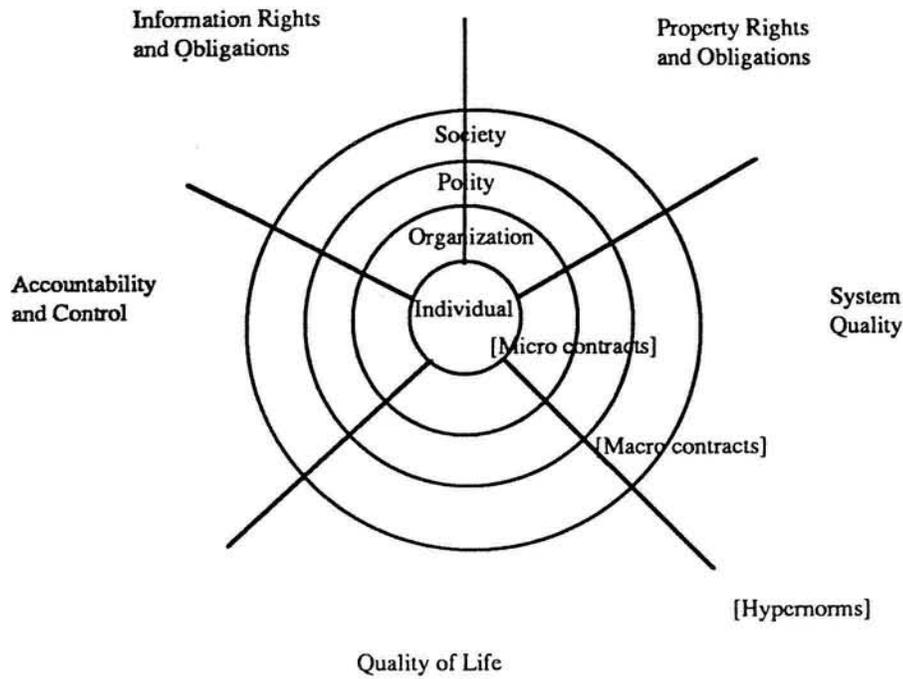
We argue, based on a review of extant texts and articles dealing with IT ethics, that there are five major constellations of issues in IT ethical space [Johnson, 1994; Dejoie, Fowler and Paradice, 1991; Forrester and Morrison, 1990]. These constellations are: (1) information rights and obligations, (2) property rights and obligations, (3) system quality, (4) accountability and control, and (5) quality of life. While this mapping is not logically exhaustive, and there may be other schemas for categorizing the universe of issues, we believe that this particular mapping is useful as a guide to IT ethics for practitioners, researchers, and students. In addition, we argue that ethical issues arise at four significant levels: the individual, the organization, the polity, and society. An IT ethics must address ethical action at each level.

Below we briefly explore this issue map, pointing out illustrative ethical issues raised at various levels of ethical analysis. In many instances we illustrate our analysis with examples of laws and legal conflicts because the law provides a useful indicator of underlying ethical and social conflicts raised by the new information technologies.

*(1) Information rights and obligations.* Because information technologies primarily effect traditional rights and obligations of with respect to information, this ethical dimension of IT has received considerable research attention. Information rights are usually defined by claims to privacy and claims to access (freedom of information). Privacy is the claim of individuals to be left alone, free from surveillance [Westin, 1967; Gavison, 1980; Hirshleifer, 1980]. Freedom of information is the claim to access and use information necessary to be an informed citizen in a democracy (Westin, 1967). These claims are protected by a wide variety of private policies, common law, constitutional, and statutory provisions in the U.S. and other societies. [USDHEW, 1973; Traver, 1994]. Despite

Figure 2

A Communitarian Social Contracts Theory of IT Ethics



**Caption:** IT ethics deals with a specific subset of issues. These issues arise in different contexts, from the individual to the group, organization, polity, and society. Ethical issues can be resolved by considering the general principles and rules which free, rational humans would propose as the foundation for civilized life beginning with the small groups in which you participate directly (micro contracts) and then extending to the larger groups in which you participate indirectly (macro contracts).

these protections, 83% of Americans in a recent poll indicate that they are concerned about threats to their personal privacy, and 85% blame computer technology? [Harris/Privacy and American Business Poll, 1993].

Because information technology creates new opportunities to deny privacy and inhibit access to information, ethical questions are posed to individuals and larger collectivities [Wolinsky and Sylvester, 1992]. Some illustrations: Under what conditions should I invade the privacy of others close to me? Should organizations monitor their employees' phone conversations and workplace chit-chat? Should the polity give law enforcement organizations the right to secretly decrypt digital communications? Should we, as a society, encourage expectations of privacy beyond the protections of one's home, say, to one's garbage, one's car, one's telephone calls from a cellular telephone or one's electronic mail?

*(2) Property rights and obligations.* Information technologies and systems have severely challenged existing law and social practices which in the past protected intellectual property. Intellectual properties are the tangible and intangible products of the intellect created by individuals and corporations. Intellectual property is protectable under one or more or three different legal traditions: trade secret, copyright, and patent law. Each provides different kinds of protections (Black: 1979:1095). However, the broad intent of all forms of intellectual property law is to ensure that inventions and ideas are quickly adopted and disseminated in commerce and the arts by ensuring the creators of new ideas and inventions shall be rewarded for their efforts [Hirshleifer, 1971].

Trade secrets involves the claim that one has created a unique formula, device, pattern, or compilation of data which is not in the public domain. Copyrights involve the claim of exclusive rights to the expression of an idea (not the idea itself). Copyrights are the principle mechanisms for protecting literature, music, artwork, and the like. Patents involve the claim of exclusive rights to the original and novel ideas behind an invention for

a limited period (seventeen years in most cases). Patents are protected by federal law (the first being in 1836).

Information technology and systems are typically used to create intellectual property. Because this property requires considerable investment to create, its protection against appropriation without compensation is vital. However, each of the existing avenues of legal protection have significant limitations when it comes to protecting IT-related intellectual property [Graham, 1984; Samuelson, 1991; 1991; 1993]. Trade secret law may provide some limited protection, but often is inapplicable because it is difficult to prevent IT-related intellectual property from falling into the public domain. Copyright law covers software, but since it fails to protect underlying ideas, it is easy for competitors to "steal" one's concepts without technically infringing on the work. Patents can also be used to protect IT-related software and other inventions, but are very difficult, time consuming and expensive to obtain. Finally, because digital works are so easily replicated, transmitted, altered, and made so compact, theft and misappropriation is easy and cheap. Slight alterations to an image can make it "unique" and therefore tempting to copy the original and alter it slightly.

Thus, new information technologies are challenging existing social practice and laws in the property rights arena. IT poses a number of unique difficulties in establishing responsibility, accountability and liability for property rights violations. Among the ethical questions that have arisen in this area are: Should I copy software that I use at work for my personal use at home? What rules should we as an organization adopt to prevent our members from misappropriating protected works in the course of business? What laws should we support to protect intellectual property? What social expectations should we encourage with respect to information-based property (for instance, should, as some believe, all information be "free")?

3. *Accountability, Liability and Control.* Because of the complexity of many IT systems, because of the long chain of events and decisions which shape the emergence of IT applications, and because of the uncertainties surrounding the use and proper operation of IT based systems, information technology poses novel questions of accountability, liability, and control.

Traditionally there are three categories of liability that courts use to deal with claims that products or services have caused physical or economic injury to consumers: breach of warranty, negligence, and strict liability tort. Breach of warranty occurs when a seller expressly or impliedly represents to a buyer that the goods or services being sold are of good quality and fit for their intended use, or that services will be performed in a particular manner. Negligence occurs when a product causes physical or economic harm to individuals, when the injury could have, and should have been prevented, and when the producer has a "duty to care" about the consumer of the product. Negligence requires fault. Strict liability in tort is a separate class of liability which arises whenever a defective product causes injury. In these cases, individuals can bring suits against the manufacturer independent of the question of fault, warranty, or duty to care. In other words, a manufacturer of a defective product that injures people can be held strictly liable regardless of whether or not he could have, or should have, prevented the defect.

It is very difficult to fit IT-based products into these existing legal doctrines. For instance, who should be held liable if a person is injured by a software product in some way, shape or form? The legal system has responded to this dilemma by trying to fit software into the existing legal schema by analogizing it to machines, books or services (arenas where there are precedents for action) although in many instances the analogy may not be very apt.<sup>2</sup> The legal results vary depending on which analogy is chosen, creating

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<sup>2</sup> For instance, software is usually quite different from a book. Unlike book users, software users often develop expectations of infallibility about their software; software is less easily inspected than a book; quality comparisons are more difficult; most software perform a task rather than describes a task as a book does; and finally, software-based services in many instances are much more central to everyday lives than books.

unprincipled distinctions and leaving much open to question. Thus, if the software is seen as being part of a machine, breach of warranty, negligence and strict liability may apply, and the manufacturer of the software may be held liable. If the software in question is seen as acting more like a book, storing and displaying information, courts have been reluctant to hold its "authors", publishers and sellers liable under any theory for its contents, regardless of the physical or economic harm that may have resulted. If software is viewed as a service, breach of warranty may apply if the seller has made specific warranties about the performance of the service, but negligence and strict liability theories will likely not.

Thus, new information technologies are challenging existing liability law and social practices for holding individuals and institutions accountable [Samuelson, 1993; Straub, 1990; Mykyten and Mykyton and Slinkman, 1990]. A number of new ethical questions are posed in this arena.

As discussed above, a central issue is who should be held accountable, responsible and liable for the consequences of the use of information technologies. What responsibilities should the user assume? What about the organizations (and the individuals involved) that create, produce, sell and profit from those products? What expectations should society allow to develop around service-providing information systems that are fast becoming integral to daily life, such as ATM services? Should the users of such systems assume the risk that such systems will occasionally fail, or should the organizations that have made them so ubiquitous be held strictly liable for any disruption in service? Issues surrounding accountability, liability and control are also at the heart of political debates over censorship and free speech on computer networks and electronic bulletin boards. Should network and bulletin board system operators be allowed to control what is expressed over a network or bulletin board, much as a newspaper or broadcaster does, or should they be analogized to common carriers like the telephone system, without any control over (or liability for) what users transmit?

4. *Systems Quality*. The debate over liability and accountability for unintentional consequences of system use raises a related but independent moral dimension: what is an acceptable, technologically feasible level of system quality? At what point should system managers say, "Stop testing, we've done all we can to perfect this software. Ship it!"

There are three sources of poor system quality: software bugs and errors, hardware or facility failures due to natural or other causes, and poor input data quality (Laudon and Laudon, 1994; Neuman, 1993; Loch, Carr, and Warkentin, 1992). Obviously, individuals and organizations cannot be held responsible or liable for "acts of God" or technologically unavoidable errors. However, they may be held responsible for avoidable or foreseeable consequences, which they have a duty to perceive and correct. But, there is a gray area: some system errors are foreseeable and correctable only at very great expense, an expense so great that pursuing this level of perfection is economically not feasible-- no one could afford the product. It is commonly agreed that zero defects in software code of any complexity cannot be achieved and the seriousness of remaining bugs cannot be estimated. Hence there is a technological barrier to perfect software and users must be aware of the potential for catastrophic failure.

The central quality-related ethical issue at the individual and organizational level is at what point should software or services be released for consumption by others, at what point can one conclude that the software or service achieves an economically and technologically adequate level of quality? What is the individual and the organization obliged to know about the quality of the software, its procedures for testing and its operational characteristics?

At the societal level, the ethical question is : do we want as a society to encourage people to believe that systems are infallible, and that data errors are impossible, or do we instead want a society where people are openly skeptical and questioning of the output of machines, where people are at least informed of the risk? By heightening awareness of

system failure, do we inhibit the development of all systems which in the end contribute to social well being? On the political level, the leading issues concern the laws of responsibility and accountability. Should we encourage Congress to impose quality standards on industry or instead look to industry associations or the marketplace to establish and enforce such standards?

*5. Quality of Life.* Not all sins are crimes. Technology gives much, but it takes away or destroys as well. The negative social costs of introducing information technologies and systems are beginning to mount as the power of the technology bounds upwards. Many of these negative social consequences are not violations of the individual rights defended by the Constitution, common law, or statute; neither are they property crimes, or crimes of any sort. Nevertheless, these negative consequences can be extremely harmful to individuals, organizations, societies, and polities. Information technologies potentially can destroy valuable elements of our culture and society even while they bring us benefits. If there is a balance of good and bad consequences to the use of information systems, who do we hold responsible for the bad consequences?

Among the leading "quality of life" ethical issues are:

*Balancing Power: Center vs. Periphery.* At alternative times in our history, IT has either a centralizing or decentralizing effect [King and Kraemer, 1986; Laudon, 1986]. Should steps be taken to encourage one effect as opposed to the other?

*Buffer Reduction and Rapid Change.* IT applications reduce time and distance which in the past buffered economic and social institutions from rapid change. What should be done, if anything, about information technology-driven time-based competition that may result in the rapid decline of businesses and other organizations which cannot cope?.

*Maintenance of Social Boundaries.* New information technologies, coupled with the growth of knowledge work occupations, mean that more and more people are working

when traditionally they would have been spending time with family, friends or relaxing [Barlow, 1991]. Should the trend toward ubiquitous computing be allowed to continue, even if in further blurring the boundaries of work and family, it weakens important social institutions like the family unit.

*Dependence and Vulnerability.* A number of researchers have argued that we are becoming too dependent on critical applications with little understanding, and no social oversight, of the complex systems on which we rely [Borning, 1987; Bulkeley, 1992; U.S. GAO, 1992]. Whether it is telephone switching systems, ATM networks, or air traffic control systems, the literature is rife with examples of poorly backed-up systems, little understanding of failure modes, and little analysis of risk. Who bears ultimate responsibility for this development -- individuals, organizations, governments?

*Equity and Access.* Information and knowledge, and access to new information and knowledge, is inequitably distributed in the U.S. There is some reason to believe that intensive IT applications growth heightens social inequities absent social interventions [U.S. Center for Education Statistics, 1990; Laudon and Laudon, 1994, Chapter 20]. What, if anything, should be done to ensure that everyone has an equal opportunity to participate in the digital age?

*Health Risks.* In 1980 at the beginning of the PC revolution no one thought that by 1992 businesses would be paying \$20 billion a year to compensate and treat victims of repetitive stress syndrome (RSI), and/or computer vision syndrome (CVS). According to some (Brod, 1982; McPartlin, 1990), exposure to computer intensive environments is a major factor in stress disease. Who should be responsible for preventing RSIs -- the manufacturer of IT equipment, the individual who uses the equipment, or the organization who employs the individual?

From this brief overview of major issue constellations we can see a very large diversity of concerns and debates, values and attitudes, stakeholders, and competing

social interests. What recommendations can we make to our students, practitioners, and researchers for dealing with this diversity of ethical issues? Below we suggest one possibility.

### **III. A Communitarian Social Contracts Theory**

How should individuals make ethical choices when confronting IT issues? One possibility widely discussed in contemporary applied ethics may be labeled communitarian social contract theory because it is based on the theory of social contracts which has a long tradition in western thought from Plato's Republic [450 B.C./1957], to Hobbes' state of nature [1651/1946], John Locke [1690/1948], Rousseau [1762/1969] and most recently John Rawls [1971].] The essence of social contract theory is a thought experiment designed to elicit the general principles which rational human beings would propose as the foundation for organized social life as an alternative to Hobbes' primitive state of nature. We call this the *macro social contract*.

However, as Donaldson and Dunfee [1994] have pointed out, the macro social contract is too unspecific, too general, and ill suited for guidance in many local situations. While Rawls posited a "veil of ignorance" that blinded the macro social contractors to their own position in society, and hence assured fairness, Donaldson and Dunfee argue that any macro contract results from a broad consensus of all interested parties. They feel that the general principle at all levels of contracting is the one suggested by R. H. Green (1994): "neutral omnipartial rule-making" descendent from Rawls' notion that we should think of morality and ethics as a *kind of public legislation where any rules or judgments must reflect the honest, free consensus of all involved parties*.

Donaldson and Dunfee extend beyond Rawls and Green by arguing that the macro contract by itself is insufficient, and that the contracting process also occurs at lower level in a series of *micro contracts*. The macro contractors agree to create free moral space in which local groups can develop their own rules based on local and situational differences

as long as the macro contract is not violated. These micro contracts can involve small work groups, departments, divisions, whole organizations, and the polity itself [see Figure 2]. As one traverses to higher levels, the constraints of the macro social contract become more operative. In this sense, our theory is *communitarian* because it relies on progressively wider and more comprehensive communities as a guide for individual behavior in any given situation.

What are the limits on moral free space for micro contractors? What are the limits on macro contractors? It is conceivable, once we give up Rawls' "veil of ignorance," that macro contractors themselves might create a contract which systematically deprives some minority group -- although this would seem unlikely given the constraint of free consensus among all parties to a macro contract. Perhaps the greatest danger is that local micro contracts would be woefully biased against other micro groups and we would end up with a self-serving cultural relativism. The Data Processing Management Association might adopt a rule requiring all members to drop their membership in other professional associations or be expelled. Communitarians like Taylor [1989] and Donaldson and Dunfee [1994] posit a set of *hypernorms* applicable across cultures and societies as final check on all contracts. Anthropologists, sociologists, and political scientists have developed a sizable literature on universal social norms which at least can serve as an indicator of hypernorms if not a definitive statement of them. Such norms as a proscription against murder, slavery, piracy, adequate health and safety can be seen as underlying tenets for founding documents like the Helsinki Final Act and other international agreements in labor, trade, and technology.

#### **IV. The Theory Applied**

Let us suppose then you are a member of the senior management of Proctor and Gamble in 1991. An employee has leaked private corporate information to the Wall Street

Journal concerning a change in top management which may effect the stock price. Eleven other senior executives decide this leak must be plugged, the guilty employee discovered, and terminated before further damage is done, to set an example to other employees [Rothenberg, 1991]. They recommend the local, friendly District Attorney subpoena all phone records from the 513 area code in the last year, identify all those calls made to the Wall Street Journal number, and further identify which of those calls were made by Proctor and Gamble employees. Once identified, these employees would be terminated. The District Attorney and the local police agree to cooperate because state law in Ohio prohibits disclosing corporate information to anyone including the press and therefore a law may have been violated. The local Bell Operating Company also agrees to these actions. There is no federal statute which prohibits such mass surveillance, and no violation of the First Amendment which protects freedom of speech and association from government interference (but does not prohibit firms from terminating employees for their public statements). Should you support this action? As outsiders, should we support or condemn this action?

There is a strong consensus in the inner management circle that the leak must stop and be punished. The privacy of the firm has been breached, and laws potentially violated. Problems arise as we leave the smaller inner circle. Would Proctor Gamble employees support as a general rule the surveillance of their phone calls--especially their private calls made off premises? Would all other citizens (non-employees) in the 513 area code support as a general rule surveillance of their calls in order to catch a single Proctor Gamble employee who may have violated a law? In the larger polity and society there is little support for giving private firms the ability to surveil the private phone calls of millions of ordinary citizens simply to catch a single employee who may have leaked some information.

In this instance, then, you could not support the action recommended by your colleagues, and we, as outsiders, would have to condemn this action because it violates

the authentic consensus of many micro contracts and at the societal level violates the broader macro contract.

## **V. Conclusion**

In order for there to be an effective IT applied ethics, as a field we need methods for arriving at ethically correct decisions which, on one hand, take into account the specificity of local situations and the uncertainties posed by rapid developing technology. On the other hand, we need methods which do not violate larger macro level understandings and principles. Social contract theory is a useful vehicle for generating neutral, omnipartial rules that can guide social action at a number of different levels. However, problems remains and the method is not foolproof.

This method does not overcome the most severe test of any ethics: so what? The "so what" argument here is simply that just because an action violates a series of micro and macro contracts, so what? I may violate these contracts, but most people will follow these contracts, and for the most part society will go on. Society remains vulnerable to opportunists. Neither does this method overcome the related problem of deriving an "ought" from an "is" [Hume, 1751/1955]. No set of factual statements describing social contracts is sufficient to generate an ought, as Hume pointed out long ago. And the dependence of the theory on hypernorms which appear deus ex machina to check potential self-serving relativism of local communities and potentially criminal societies and organizations, is disturbing. More research is needed in the area of global international communities and the potential for global macro contracts which can act as constraints on micro contracting. These caveats aside, social contracting theory and communitarian perspectives offer a useful extension beyond utilitarianism and stakeholder analysis, and a useful area to begin the debate over a practical, normative IT ethics.

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