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THE PROFESSIONAL RESPONSIBILITY OF THE TECHKNOWLEDGABLE

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Introduction

When considering the issue of ethical or right behavior in the work setting, the rationale for adopting such a posture emanates from a couple of key sources. First, a basis for ethical behavior can be found in the context of the business as a social institution. Second, a rationale for ethical behavior can be obtained from guidelines implied in the notion of professionalism. It can also be suggested that in some situations a third motivating factor exists. This is for the case of the technologically sophisticated.

The rationale for this additional motivating factor is that the techknowledgable in today's society by virtue of their knowledge possess a great deal of power in organizations. With this power comes an added responsibility regarding right behavior.

This paper will outline the basis for professional responsibility in general and for the technologically elite in particular. It will then discuss a hierarchy of issues confronting people in the computer profession. Finally, some reflection on what can be and is being done will be offered.

A Basis for Ethical Behavior

One rationale for ethical behavior is that it is in business' best interests to behave this way. A tone of right behavior is consistent with the expectation of trust and confidence that businesses need to have about each other. For example, honesty in dealing with contracts benefits both parties if each can expect a certain type of behavior from the other. Just as individuals are expected to behave according to certain norms, business well. A group is not exempt from expectations about behavior that exist for individuals.

Another reason that businesses should be expected to conform to codes of behavior is that they are social institutions. As such they bear responsibility for the effect of their activities on society. If a given business were to be viewed as a complete system in and of itself then a certain logic could suggest that right behavior would only be relevant in the context of internal operations. This is not the case, however. Businesses exist by virtue of the society, therefore, they are subsystems of a larger system - the society. It is society through its laws that grants the corporation the right to exist. Thus a social contract exists between it and the society in which it operates. For this reason as well, businesses and those who work for them are admonished to behave in a socially responsible manner.

Aside from arguments levied at industry in general, another set derives from the nature of those who work as professionals. Professional responsibility is integral to the notion of a profession: Part of this is due to the special status assigned to them. To exercise a skill for the benefit of humankind places the professional in a special moral relationship with his/her clients.

Closely related to the previous argument is that which draws upon the societal context within which the professional develops and learns the profession. The fact is, professions exist because of society. Fairness requires that professional people act accordingly. One may argue that if an individual were to attend private schools and not make use of government loans then this person would owe nothing to society. This argument reflects a narrow view. Consider the computer profession. If one attends a public or state-related institution, it should be noted that society has paid for the equipment that the student uses to learn the profession. If one attends a private school some questions also come to mind: Where did the knowledge originate that filled the textbooks? Who supported the research that resulted in the body of knowledge that underlies the computer profession? Either way, there is a larger society that is partly responsible for the existence of each professional and should reap some rewards for that effort.

As was stated earlier, the preceding arguments can be used to support the notion of ethical behavior for any class of business professionals. But the intent of this paper is to address a subset - the techknowledgable. These people have a responsibility that goes beyond the general trust society could place in them as professionals. In an increasingly technological and information-intensive society, those who manipulate the tools and thereby manipulate the information must be held morally accountable for the power they possess. Not only are the technologically sophisticated influential as a single profession but increasingly other professions are dependent upon them. Virtually every profession has a body of knowledge stored in machine readable form and accessed via database system. It is the information/computer professionals who develop the systems that manage the information which another group will use to

make important decisions. In another vein, computer programs exist that support the operational level of most fields. The architect uses programs that aid in the design of structures; the physician has programs that will monitor a patient in the intensive care unit. Upon reflection, it should become apparent that the techknowledgable are indeed a new ruling class in society.

There are a number of issues that the information professionals need to address with regard to right behavior. There exists, however, a hierarchy. It can be expressed in terms of different continua: from the concrete to the more abstract; from the here and now to the more distant future; or from the domain of the computer field to the domain of the larger society.

This hierarchy has been employed to discuss the issues which have been assigned to one of three categories that expresses the immediacy of their resolution. The first category identifies the minimum requirements of professional responsibility for computer professionals. The second set of issues are those that ought to be addressed in light of the position of influence and power held by the technologically elite in our society. The final group of issues are larger ones that cannot easily be resolved. They are the ones that require consideration if one embraces the notion that these professionals are truly in positions of power and are shaping both our world and the way in which individuals relate to it. These three categories have been labeled "Must Do," and "Could Do," respectively.

"Must Do" Issues

Clearly, computer professionals ought not engage in unethical activities. Sometimes this admonition is made easier: certain unethical acts are also illegal. But there are also numerous examples of the law not keeping pace with the rate of technological innovation. Well publicized accounts of computer crimes often point out that the criminals technically did nothing illegal. However, the fact remains for example, that violating confidentiality is wrong whether or not privacy legislation extends to the particular organization involved. A closely related point has to do with the use of technology to assist with an activity. Taking the property of another is wrong behavior whether one uses a gun or a computer terminal. This posture applies to the unauthorized use of one's computer resources, proprietary programs and private files as much as it does to one's financial assets. The principle remains: using the computer does not absolve one from the requirements of behavior that are expected in non-computer mediated situations.

Another ethical issue of immediate importance is accountability for one's behavior as a professional. An aspect of this is the requirement that designers do more than merely respond to the

client's expressed need. It is the techknowledgable who understand the implications of the technology and these should be pointed out to the client whether or not he/she asks about them. Unsophisticated clients might not anticipate the need for adequate system security. They should be made aware of such things. At the other extreme, it is unethical for consultants and vendors to take advantage of computer illiteracy by creating situations of dependence upon them. This has been done through the failure to provide adequate system documentation, altering system software so that vendor warranties and maintenance contracts are voided and changing the computer hardware so that standard programs no longer run on it. There are limits to caveat emptor. Finally, professionalism requires that the professional work in the best interests of the client whether the professional is directly employed by the business or acts as a consultant. Thus, while it may be intellectually stimulating for programmers to work with leading-edge hardware, this may not be in the company's best interest. More so than many other professions, those knowledgeable about the workings of computers are listened to and their recommendations are followed. These people are therefore accountable for the advice given and the resultant effects.

A third issue speaks directly to elitism and the responsibility of power. Increased automation leads to increased centralization of information whether the computing environment is a single large computer or many decentralized ones. The information is centralized around the machines and those who manipulate them. Professional responsibility requires that these individuals be sensitive to the power that they hold and act accordingly. In addition, the technologically elite have a responsibility not to perpetrate their power by withholding the information - the source of power - from others. This is done frequently and is couched in the excuse of jargon. The use of terminology that excluded others from meaningful involvement should not be minimized as the product of scientific idiosyncrasy or ego. It has been a successful method of maintaining power by keeping one's actions removed from oversight.

A final issue of this category relates to the notion of the business enterprise as a subsystem of society. By virtue of the changes brought about through advanced technology, those responsible for implementing and managing such systems need to act in accordance with an awareness that their actions greatly effect outcomes. Oftentimes, the outcomes extend beyond the bounds of the place of employment. Displacement is one such example. Privacy invasion is another. Customer harassment due to computer malfunctions is a third. Computer professionals have a responsibility to anticipate and plan for these eventualities. A little more abstract but no less important is the issue of the impact of information processing technology on the reality it is designed to represent. As society becomes increasingly information-based that is, decisions and actions are increasingly dependent upon formal information - our perception of reality is shaped by the tapes, disks,

programs and data that govern this information. Those who manage such tools share responsibility for the extent to which this is an accurate representation. An example is the use of computer-based systems for the screening of job applicants. Care should be taken that what can be easily stored in bits and bytes can not supplant the totality of the individual. The Privacy Protection Study Commission has noted this fact in the context of the inherent right of an individual to control information about him/herself whether it is communicated through dress and behavior or stored in a data file.² The charge to computer professionals is to closely monitor both the uses of such systems and the procedures governing the type of data that is stored.

"Should Do" Issues

Beyond the requirement to rectify known situations of unethical or less than professional behavior are a set of issues that look a little more to the future. In order to anticipate and hopefully prevent some of the situations discussed thus far a proactive approach to data processing planning and management needs to be adopted.

Underlying the first such issue is the thesis that people have intrinsic value that is different from and more important than machines, money and materials. Since the beginning of industrialism this notion has been challenged. Today, as never before, it is under attack. It is not merely the tasks of record-keeping and paperwork management that have been drastically changed. Perhaps more significant are the structural changes in the nature and meaning of work that result from the automation of the office and the assembly line. The increased mechanization of tasks has contributed to the increased specialization of labor and the resultant fragmentation in the work place. While specialization has its advantages both for the employee and the business enterprise, it has its drawbacks as well. Individuals have needs and expectations regarding their jobs that go beyond financial recompense.³ The satisfaction of these needs is also in business' long term best interests.⁴ The introduction and management of automation that does not respond to the needs for social satisfaction, self esteem and personal growth is morally suspect and bad business practice.

Quality of work life issues that result from automation also suggest two distinct but closely related charges. The introduction of technology is usually accompanied by some resistance - to change in general and the technology in particular. Those responsible for such innovations should be sensitive to and responsible for dealing with this resistance. Older employees who have worked in a certain fashion all their lives deserve more than an after-the-fact briefing on the new "system" that may radically alter their way of doing things. They should have counseling, educational and re-

training services available to them. Again, this recommendation is consistent with management principles. No technology, no matter how sophisticated, will be successful if there is sufficient resistance to it.

Closely tied to the issue of resistance is that of organizational changes. Altering the way information is processed and communicated has an impact on the organizational structure. This is the case whether or not the lines of authority are redrawn. The responsibility of data processing personnel to contribute to a humanized work environment extends to actions and procedures that acknowledge the impact of this technology on the operations of the organization.

It has been suggested earlier that an added motivation for professional responsibility on the part of the techknowledgable derives from the fact that others' jobs increasingly depend upon them. Given that this is the case the computer profession should be sensitive to the reality of changes in other disciplines and professions due to the increased dependence upon computers. And this should generate some questions for serious consideration: Is a systems analyst responsible only for the design of a computer system or should he/she be bound to explore the impacts as well? It might be argued that those who employ the analysts and designers should be responsible for exploring higher order impacts of the technology. To this one could counter: Who is better qualified to probe the unintended consequences of technologies than those who build them and design the environments within which they will operate? Another set of questions relates to the notion of professionalism in light of this wide-spread use of technology. One might wonder how a professional can be held personally responsible for decisions and actions when they are increasingly influenced by the operation of computer programs - written by someone else. What happens to the implied value placed upon professional judgment? Judgment is a characteristic that still eludes the domain of the technology. Are there limits to the professional decision making that computer programs should be allowed to make? Those working in the area of medical diagnosis systems, for example, have been quick to point out that such systems are intended to play a supportive role and not supplant the work of the physician.⁵

Concerns such as those just highlighted suggest that this issue of impacts ought to be extended beyond the realm of changes in professions. A suggestion that the techknowledgable should be involved with influencing the development and use of technology in general is being offered here. The rationale for this admonition recalls what was stated earlier: those who best understand the capabilities of the technology share some responsibility for the uses to which the technology is put. This viewpoint is consistent with another: scientific research is not amoral. Only at the most theoretical levels can the context be totally removed from the research. There is precedent for concern on the part of scientists and technologists about the uses made of their inventions. Physicists

working on the atom bomb later became some of the most outspoken critics of its use.⁶ Today, associations such as "High Technology Professionals for Peace" reflect acute awareness of the responsibility of the scientist for the uses made of his/her research.⁷

It has already been noted that increased use of formal information for decision making influences the perception of the entity about which the information is stored. This notion can be generalized to suggest that the quality of information itself can be changed with the use of automation. The charge to the techknowledgable is to be aware of this potential and to use this awareness in a responsible fashion. Some might hold that the content of information remains the same whether it is stored in human - or machine - readable form. Another view would suggest that obtaining data in concentrated form (i.e., from the computer) yields a different understanding of that same data were it collected in piecemeal fashion through manual methods. This same logic has led some to suggest that paperwork inefficiency is one of the best protections of individual privacy. In a similar vein, controlling the flow of data can alter the meaning obtained from the information. The dissemination of too much or too little information can become a vehicle for manipulative persuasion.⁸ Truth in advertising requirements acknowledge this fact.

"Could Do" Issues

The final set of issues are presented not so much as recommendations for action as topics for reflection. They are offered as notions that need to be addressed by some body. Inasmuch as the techknowledgable should be able to understand the greater implications of their technology, they are presented here.

In both the academic and popular literature there have recently appeared works that deal with the new mentality surrounding computers.⁹ "Computermania," "hacker mentality" and other labels have been used to describe individuals who derive more pleasure from interacting with machines than from interacting with people. These sometimes humorous anecdotes have a serious side to them. They should give one pause to consider the increased rationalization that is pervading society. When it is more often the case that "the computer can do it better than people," will there be an accompanying trend toward devaluing the person? What is the potential impact of decreased social interaction in the face of increased involvement with machines? Who, then, should be responsible for helping society cope with the "hacker" mentality?

Another area for possible involvement of the technologically sophisticated is that of influencing the development and use made of these new

tools. Some have suggested that computer professionals should be actively involved in monitoring socially questionable uses of computers such as for clandestine intelligence gathering and for assisting in subverting governments.¹⁰ Rather than focusing on new technology for the sake of innovation a societally-oriented perspective might suggest that more attention be given to better uses of existing tools. This notion of appropriate technology has been suggested with regard to other areas of technology as well.¹¹ This is certainly a controversial issue and one not easily resolved. The fact remains, however, that some people need to be addressing these topics, and among that body should be the techknowledgable.

What Is And Can Be Done

In general, a heightened awareness about the issues needs to be developed among the computer professionals. In conjunction with this, attention needs to be given to the responsibility that knowledge and control of the technology brings about. These objectives can be pursued through a number of social institutions.

In the education of computer professionals a societal/ethical viewpoint is increasingly being incorporated into the curriculum. This is done both in the context of existing courses and through the inclusion of new courses dealing specifically with social responsibility.¹² The goal of both approaches is to balance the technical/pragmatic orientation with a behavioral/ethical one. Students should learn to see the ethical ramifications in the context of an overall cost/benefit analysis.

Industry should play a part as well. Professional accountability is and should be emphasized as an important requirement in hiring computer professionals. In addition, a vehicle for airing complaints and anticipating negative consequences of technology should be established. The term "social audit" has been applied to such a mechanism.¹³

The computer profession, itself, through its professional associations is involved in this endeavor. It can be influential in supporting an anticipatory approach to ethics. Rather than a reactive attitude which attempts to counter known unethical behavior, a proactive approach encourages behavior that keeps ethical norms in mind. An example of this is sensitivity to potential abuses in the design of files containing confidential information. In implementing this proactive posture a multidimensional approach should be employed. That is, professional responsibility should be closely linked to the particular aspect of the profession in which the individual operates. The issues are different for a system designer than for a programmer, for example. Finally, codes of ethics have been developed.¹⁴ There is some controversy over whether codes can be an effective means of enforcing ethical standards. At worst, they represent conscious attention paid

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to the issues by the profession. At best they are a means of internal enforcement of professional responsibility.

Conclusion

One may wonder whether all this talk about professional responsibility will yield any positive results. This author's experience as an educator is that students see these issues as important and want to consider them. Articles appearing recently in the professional publications reinforce this view.¹⁵

The encouragement of professional responsibility among the techknowledgable should begin during the formal education and be reinforced in the workplace. In the educational setting it hinges on the premise that increased awareness will lead to heightened sensitivity which will in turn result in appropriate behavior. This outlook needs to be supported by specific activities on the part of employing organizations. Policies should be in place to enforce the "Must Do" issues, planning needs to be conducted in order to explore the "Should Do" concerns, and research can be undertaken into the "Could Do" topics.

Notes

1. This author would like to give credit for the first use of this term to her students in the "Values and Choices" course at Bentley College. They used it in describing a future society that is dominated by advanced technology.
2. Personal Privacy in an Information Society: The Report of the Privacy Protection Study Commission, Washington, DC.: U.S. Government Printing Office, 1977, p. 13.
3. Abraham H. Maslow, "A Theory of Human Motivation," Psychological Review, 50(1943), pp. 370-396.
4. For a discussion of this see: William G. Ouchi, Theory Z: How American Business Can Meet the Japanese Challenge, Reading, MA: Addison-Wesley Publishing Company, 1981.
5. For a discussion of the Caducens system developed at the University of Pittsburgh see, "Artificial Intelligence: The Second Computer Age Begins," Business Week, March 8, 1982, pp. 66-75.
6. Robert Oppenheimer and Enrique Fermé, for example.
7. This organization, established in 1982, assists professionals who are interested in non-weapons related to work. It also sponsors a series of talks which cover selected aspects of the arms race with an emphasis on the relevance of these problems to the high technology community.

8. Robert Cøhlert, "Information, Persuasion and Freedom: Implications of Communications Technology," Information Processing and Management, (16) 1980, pp. 109-114.

9. See, for example, Philip G. Zimbardo, "The Hacker Papers," Psychology Today, August, 1980, pp. 62-72.

10. Richard E. Sprague, "Computer Professionals: What Their Social Concerns Need To Be," Computers and People, February, 1975, pp. 36-39.

11. E.F. Schumacher, Small Is Beautiful, New York, Harper & Row, 1975.

12. The ACM Curriculum Committee on Information Systems has included courses entitled "Human and Organizational Behavior" and "Social Implications of Information System" among its core curricula. See, "Educational Programs in Information Systems," Communications of the ACM, (24) 1981, pp. 124-133.

13. Norman Bowie, Business Ethics, Englewood Cliffs, NJ: Prentice-Hall, Inc., 1982, pp. 106-112.

14. Donn B. Parker, "Rules of Ethics in Information Processing," Communications of the ACM (11) 3, 1968, pp. 198-201.

15. See for example:

Donn B. Parker, "Ethical DP Behavior Requires Action Plan," Computerworld, August 16, 1982, pp. 39,42.

Kenneth Wozniak, "Rethinking Ethics for DP Professionals," Computerworld, September 30, 1982, pp. 61, 64, 68.

"Self-Assessment Procedure IX: A Self-Assessment Procedure Dealing with Ethics in Computing," Communications of the ACM, (25) 3, 1983, pp. 181-195.

David H. Brandin, "The Challenge of the Fifth Generation," Communications of the ACM, (25) 8, 1982, p. 510:

...ACM can get involved in the crucial societal issues that will emerge - regardless of who develops the technology. We cannot and should not blindly develop this technology; those interactions between society and the technology will be major forces in the future."