

# **ICT Workers and Professional Attitudes:**

## **Construction of an Appropriately Professional Working Environment**

By Kiyoshi Murata

### **Abstract**

Nowadays, information and communication technology (ICT) is ubiquitous, and the quality of our home, work and social life is significantly dependent on the quality of ICT-based information systems. Since the majority of ICT and ICT-based information systems are developed and used in business organisations, ICT workers, including ICT professionals and ICT non-professionals or end-users, have both intentional and unintentional power over the general public. They have to recognise their responsibility to the general public and develop a professional outlook and attitude in order to create and maintain a safe and reliable information society.

Well-organised codes of conduct for guiding ICT workers in their professional behaviour have already been laid down; however, these codes may not function well on their own, unsupported by context. An ICT worker is not necessarily an independent and unchallenged entity; he/she works within a complex environment filled with various types of stress and pressure. This context might affect individual decisions, which may result in unprofessional behaviour, even though that individual has made a conscious decision to abide by a code. Therefore, the construction of an appropriately professional working environment, designed to encourage ICT workers to develop their sense of professional ethics, could offer a useful strategy for making codes of ICT professional conduct more effective.

### **1 Introduction**

In industrial nations, information and communication technology (ICT) is ubiquitous, and is necessary for a great number of individual and organisational activities. As a result of ICT development such as database and network technology, and the explosive growth of the Internet, a great majority of business organisations conduct operations in an eBusiness environment, wherein most communication is conducted via Internet technology. It is no exaggeration to claim that the quality of home, work, and social life in general significantly depends on the quality of ICT-based information systems.

A consequence of society's dependence on ICT and ICT-based information systems is that defects and malfunctions in ICT-based information systems, along with ICT abuse, cause serious, and sometimes catastrophic, situations. Malicious or negligent development or use of ICT and ICT-based information systems has led to a number of incidents that have infringed on human rights and corroded human values. Thus, an ICT-dependent society is vulnerable. The development of high-quality information systems, and their reliable operation, is essential to the dependable and secure functioning of society as a whole.

Since business organisations play such a major role in the development and utilisation of ICT-based information systems, ICT technology professionals who are employed by business organisations, and develop and maintain ICT and ICT-based information systems, have both intentional and unintentional power over the public. ICT non-professionals or end-users who work in business organisations and use ICT-based information systems independently also have a significant influence over the quality of life in modern society. All ICT workers, not simply ICT professionals, but also non-professionals or end-users, must recognize their responsibility to the general public and develop their professional ethics and outlook in order to maintain safety and security, both in the eBusiness environment and in society.

There are already well-organised, carefully developed codes of ICT professional conduct to guide ICT workers in their professional behaviour (*e.g.* [Gotterbarn et al., 1999]). However, these codes of conduct may not function well alone. We cannot ignore the fact that the majority of ICT workers are employed by for-profit businesses. Moreover, any code of conduct is subject to interpretation, and the extent to which ICT workers in business organisations actually follow a code of conduct tends to be influenced by their organisational and social structures and cultures.

This paper will clarify the conditions that must be met in order to create efficacious codes of ICT professional conduct that will help to make a safe and reliable information society:

- (a) ICT workers, not only ICT professionals but ICT non-professionals, should develop their sense of professional ethics and their professional attitude as the basis for interpreting codes of ICT professional conduct; and
- (b) Organisational and social measures should be taken to establish appropriately professional working environments, in which ICT workers are supported in behaving according to their professional code of conduct.

The next section points out how important a sense of professional ethics and professional attitudes are to ICT workers. Section 3 examines some typical ICT working environments, including an illuminating Japanese case. Section 4 explores organisational and social measures required for the construction of an appropriately professional working environment.

## **2 Importance of a Professional Outlook to ICT Workers**

## **2.1 The Notion of Profession and ICT Professionals**

The word profession has various meanings, from broad to narrow. In academic fields this word is used in a restricted sense, which may be summarised into the following criteria or characteristics [Flexner, 1910; Flexner, 1915; Johnson, 2001; Kizza, 1998; Yamada, 1998]:

- (a) A highly specialised body of knowledge and technique: members of a profession have an advanced, systematic, and exclusive body of knowledge, as well as techniques acquired through long-term education and training; furthermore, they continue to derive their raw material from science and learning.
- (b) Autonomy with responsibility: professionals apply knowledge and techniques to problems freely and autonomously, assuming substantial personal responsibility; they are governed by a developed sense of personal discretion.
- (c) Self-organisation: the social and personal lives of professionals tend to be organised around a professional nucleus; professional associations or groups are organised in order to set definite and practical ends, to set standards for practice, and to control the qualifications related to the profession and its membership based on its ends and responsibility.
- (d) Public service: the professions have assumed an increasingly altruistic motivation, taking on the aim of working in the public service or to fulfil the profession's social function.

While the term ICT professional or computer professional is regularly used in everyday life, many researchers do not consider work related to ICT and information systems 'professional' in this restricted sense. For example, Hodges [2001] states that work done on computers by specialists and users is so diverse that standards of excellence, notions of success, and internal rewards are not common within the community. This means that there can be no community of values, or agreement on standards of behaviour, which constitutes the foundation for a sense of professional obligation.

Linderman and Schiano [2001] have also claimed that the field of information technology cannot be a profession because it does not meet some of the defining conditions for a profession, such as certification standards, agreement on educational requirements, and meaningful or enforceable sanctions for unprofessional behaviour. Chief information officers (CIOs) are often not promoted from a group of colleagues, and may not have appropriate qualifications; in addition, priorities are often based on industrial and market interests. Consequently, those who consider themselves to be ICT professionals may encounter identity problems and a power vacuum, which may lead in turn to a vacuum when it comes to social responsibility.

## **2.2 Professional Attitudes and the Stature of ICT Professionals**

Even though work related to ICT and information systems may not constitute a profession in the traditional sense, it is not fair to say that it would be ineffectual or misleading to apply

professional ethics to this evolving field. Instead, with a view to creating and preserving a safe and reliable information society and eBusiness environment, it is far more constructive to use knowledge yielded from the field of professional ethics to examine how the ICT field can fulfil its social functions and responsibilities, and what kinds of behaviour are desirable for those ICT professionals who develop and maintain ICT and ICT-based information systems.

For example, we could create an imaginary ICT professional who behaves according to some socially accepted code of ICT professional conduct as an ideal; then we could apply this behaviour to a real-world ICT professional, situated within a specific context. The goal is for real-world ICT professionals to develop a 'professional outlook' that underlies their code of professional conduct, because no code can be exhaustive or guarantee appropriately professional decisions, and rapid ICT development could continually create novel ethical problems.

The development of a professional outlook and a sense of professional ethics should promote the following elements:

- (a) Altruism: those who develop a professional outlook should recognise that their work is primarily a form of public service, and that public interest should guide their judgment and decision-making.
- (b) Intellectual modesty: they should recognise that the quality of their work depends upon their knowledge and understand, therefore, that cognitive limitations and obsolescence of knowledge can reduce the quality of their work. This recognition leads to a respect for others and motivates continuous learning.
- (c) Integrity: they should accept full responsibility for their work and remain honest with themselves and with others.

### **2.3 Necessity of a Professional Outlook for ICT Non-professionals**

Today, most white-collar workers in developed countries are ICT workers; furthermore, majority of them are ICT non-professionals or end-users. ICT non-professionals mainly process information, utilising ICT and ICT-based information systems to perform various tasks, from routine work to the creation of knowledge. Usually, they have some knowledge concerning ICT, and are authorised to access certain data, including personally identifiable information (PII), within their business organisation, according to their position and task. Their organisations provide them with computer facilities so that they can process data, and even write simple computer programs, even though they are called end-users. In some business organisations, end-user computing and development is recommended as it can enhance productivity in business operations, and systems developed by end-users can be used by colleagues. Thus, it is difficult to draw a clear distinction between ICT professionals and non-professionals based on knowledge and business operations.

If ICT professionals could control all the behaviour of ICT non-professionals by providing them with knowledgeably developed ICT and information systems, ICT non-professionals could avoid responsibility for their behaviour related to the use of ICT and information systems. Of course, this is not the case; any artefact is subject to interpretation and its developer cannot completely control how others use it. Consequently, ICT non-professionals may have power over a wide range of people and groups, based on their empowerment with respect to information systems. Even though these workers share less responsibility than ICT professionals, they too should develop a professional outlook in order to create and preserve a safe and reliable information society. Flexner's words are particularly appropriate here:

But, after all, what matters most is professional spirit. All activities may be prosecuted in the genuine professional spirit. In so far as accepted professions are prosecuted at a mercenary or selfish level, law and medicine are ethically no better than trades. In so far as trades are honestly carried on, they tend to rise toward the professional level. ... In the long run, the first, main and indispensable criterion of a profession will be the possession of a professional spirit, ... [Flexner, 1910]

### **3 ICT Workers in Business Organisations**

#### **3.1 Constraints on ICT Professionals in Workplaces**

ICT professionals now have significant social responsibility; this will never diminish because of their intentional and/or unintentional power [Huff, 2003] over a wide range of people and groups. The development and deployment of ICT and information systems has transformed society irreversibly [Murata, 2001], and the decision-making and value judgments that ICT professionals embed in the ICT and information systems they develop constitute an invisible factor in this transformation.

It is impossible to ignore the fact that the majority of ICT professionals work for business organisations; they work in the context of a market economy and a business structure. Sometimes, they may be coerced into following 'logic of business' that causes them to lose touch with the public interest.

Usually, ICT professionals in workplaces are under two types of constraint: contractual and intellectual. The latter involves human factors such as limits to cognition and knowledge; this is inevitable for both ICT professional individuals and groups. The former relates to the multiple roles played by an ICT professional in the workplace; he/she is required to follow working regulations as an employee, to abide by a code of professional conduct as a professional, to meet due dates on a budget as a contractor, to support a household as a member of a family, and so on.

These constraints often prevent ICT professionals from developing their sense of professional ethics and outlook, thereby constraining their sense of responsibility and accountability. For instance, problems in software codes caused by many hands and diehard bugs, which are typical barriers to ICT professional accountability [Nissenbaum, 1994], could be avoided if ICT professionals had no limits in cognition and knowledge or could spend unlimited time and money. However, because ICT professionals play many roles, conflicts can arise between responsibilities to different stakeholders, making it difficult to maintain a sense of professional responsibility [Johnson, 2001: 74-76]; in addition, time constraints may give ICT professionals an incentive to disregard democratic values and to make a decision selfishly, or one based on the economic and political power of stakeholders.

### **3.2 Working Environment of ICT Professionals**

Complicated situations related to responsibility and accountability never lighten the ethical burden of ICT professionals. However, a highly stressful and physically demanding working environment can disrupt the professional outlook of ICT professionals, causing them to have an irresponsible or an apathetic attitude.

ICT workers in business organisations do not operate in a vacuum, and are not necessarily independent and unchallenged. Often they work in complicated situations with conflicting responsibilities, and it can be difficult for them to appropriately prioritise their professional responsibilities. ICT-based information systems are often developed within tight schedules and tight budgets, with only essential personnel. These factors may prevent developers from addressing ethical issues relating to their information systems.

ICT workers also tend to have a precarious position within business organisations; in modern global capitalism, where investors are relatively powerful in relation to business organisations as compared to other stakeholders, many business organisations now adopt personnel policies centred on improving labour productivity and reducing personnel costs, forcing longer working hours and less rewards on all office workers. ICT has been integral to 'reengineering' business processes, the result of which has been a reduction in redundant personnel since the early 1990s. Today it is ICT workers who are threatened by cost-cutting employment policies that recommend replacing full-time employees with contract workers or temporary staff, and experienced ICT workers with fresh university graduates. Rapid ICT development, which has been described in 'dog years', provides human resource managers with an excuse for the dismissal of experienced ICT professionals; only those who have knowledge about state-of-the-art ICT are considered indispensable. Because ICT professionals produce information, which can be immediately transferred anywhere via the global net, offshore employment or global outsourcing of labour can also threaten the status of ICT professionals in developed countries. Consequently, ICT workers are often employed in a highly stressful and physically demanding business environment, and it is likely that many are more concerned with

their job status, personal obligations, and retirement than with social responsibility.

Such a difficult work environment may affect the judgment of ICT workers, and may cause irresponsible and apathetic attitudes, even in workers who consciously intend to abide by codes of professional conduct; it may also undermine the professional spirit underlying these codes. Therefore, the construction of an appropriately professional environment, designed to encourage the development of professional attitudes in ICT workers, could be useful for making codes of ICT professional conduct effective. ICT workers employed in a positive business environment would be more motivated to uphold their social responsibilities.

### **3.3 Moral Crises in ICT Workers**

Many ICT non-professionals have working environments similar to those mentioned above. They tend to have relatively long working hours and fewer rewards, such as fringe benefits and company pensions. In order to reduce personnel costs, these workers are often employed for shorter periods, and there tend to be more contract and temporary workers. For these reasons, many ICT non-professionals feel that their organisational and social status is getting precarious.

As the phrase ‘jobless recovery’ indicates, even business improvement cannot improve the working environments of ICT professionals and non-professionals. Managers who force massive layoffs under the pretext of ‘restructuring’ are applauded if the result is improved, even short-term, profit. These circumstances force many ICT workers to be concerned about their job status, everyday living expenses, and old age; accordingly, they give business logic priority over professional spirit.

It is easy to blame ICT workers who lack a sense of professional ethics and a professional outlook. However, the working life of an individual ICT worker may not necessarily be helpful in this respect; it may be very difficult to inspire an appropriately professional outlook, and to discourage unprofessional behaviour, when an employee is forced to work in a highly stressful workplace with poor working conditions. The saying “an empty sack cannot stand upright” applies to ICT workers. In this working environment, ICT workers have few choices; they have the right to protect their lives and families, and they may be forced to choose between this right and the professional quality of their work.

### **3.4 Working Environment of ICT workers in Japan**

In Japan there are thirteen kinds of national accredited certificates relating to ICT (ten for ICT professionals, one for system auditors, and two for end-users). One objective of these certificates is to establish the social status of information technology engineers. However, few Japanese firms require certification, even ICT related firms such as hardware manufacturers, software houses, and consulting firms. Work experience in system development or maintenance

is considered more important, and is used to evaluate the abilities of ICT professionals.

Many employees in Japanese firms, especially firms related to ICT, are called System Engineers (SEs). This job title covers employees who engage in information system analysis, design and development, and project management. They are also often responsible for pre-sale and post-sale technical consulting. SEs do not have high status in Japanese firms or society. On the contrary, they are often considered 'disposable' personnel because their job is so physically demanding; in addition, they are usually required to finish their work by a scheduled completion date, which is usually set very tightly.

The Japanese word "SENMONKA" is considered to correspond to the English word 'professional'. However, SENMONKA does not exactly correspond to the term 'professional' in the narrow sense described in section 2.1, and Japanese in general do not recognize the difference between a professional and an artisan, nor between a profession and a trade. This makes it difficult for ordinary Japanese to associate a professional with social interest.

The following case is based on a real situation. It represents how ICT professionals are likely to act in an ethically questionable way given certain organisational and social circumstances:

DAMEMOTO, a large Japanese automobile manufacturer, decided to replace its outdated mainframe-based information system with a state-of-the-art C/S system. DAMEMOTO's CIO had worked in production management at DAMEMOTO's main factory for over thirty years and had been promoted to his current position six months ago. This project was a good opportunity for him to show his competence as CIO, so he was determined to construct a flawless information system.

A joint venture was organised to develop DAMEMOTO's new system; several experienced system engineers from the four software houses involved in the joint venture were ordered to join the project team. A clause in the contract stated that they must provide the CIO with a semi-monthly report of 'the bug control curve' to help him follow the project's progress. The bug control curve was an application of a quality control (QC) measure which was commonly used in Japanese automobile factories; the CIO proposed it, based on his experience in production management.

The CIO told the project team that he expected the number of bugs in the system programs to approximate a logistic curve. That is, if the project were well managed, the number of bugs detected would diminish as the project progressed, and would asymptotically become zero by the end of the project. Conversely, if the number did not diminish, the CIO would consider this to be evidence of the project management's failure.



However, it is impossible to control the number of bugs detected during this type of project. The project team reluctantly decided to insert bugs intentionally in the programs they coded and to 'control' the number of bugs detected. As intended, the shape of their bug control curve was nearly a logistic curve.

## **4 Construction of an Appropriately Professional Working Environment**

### **4.1 Organisational Measures to Construct an Appropriately Professional Working Environment**

In order to create and preserve a safe and reliable information society, it is necessary not only to institute a code of professional ethics for ICT workers, but also to take organisational measures to relieve the pressure and stress that can induce unprofessional behaviour. Managers in business organisations need to understand that an appropriately professional working environment, in which ICT workers are prompted to maintain a professional attitude and to behave in an ethical manner, has practical or strategic value as well as ethical value.

ICT workers operating in an appropriately professional working environment could contribute to improved business performance by means of:

- (a) Their professional integrity, which could improve the quality and reliability of the goods and services they produce, thereby boosting the organisation's trustworthiness and reputation, and lowering the costs of human resource management (HRM);
- (b) Their concern for public interest, which could mean caring about a wide range of stakeholders and, therefore, obviating risks to the organisation's trust and reputation; and
- (c) Their high motivation for learning, which could facilitate maintenance of a high standard of knowledge and lessen HRM costs such as those incurred for in-house education.

In the eBusiness environment, an organisation's trustworthiness and reputation are key, but intangible, assets in the construction of relationships with business partners and customers [Murata, 2003]. Even in the short term, an appropriately professional working environment can be quite effective in enhancing an organisation's business performance. In the long term, a business organisation with an appropriately professional working environment could enjoy favourable relationships with its business partners, customers, and its skilled and loyal employees, helping the organisation to remain competitive.

The following measures could be applied to take pressure off ICT workers and to make their working environment less stressful: guaranteeing ICT workers enough income for their living expenses, including such expenses after retirement; guarantee of status; recruitment of a sufficient number of employees; clear presentation of the typical career path; intrinsic motivation through challenging tasks; manifestation of the business organisation's values; and provision of mental health care.

In order to construct such a working environment, whereby ICT workers would be supported in conducting their duties with professionalism, both organisational business measures and social measures are required.

#### **4.2 Social Measures to Support an Appropriately Professional Working Environment**

An appropriately professional working environment for ICT workers is beneficial to society; poor working conditions tend to cause fatigue and apathy in workers, which can lead to insensitivity to ethical issues, ensuing, ultimately, in failures within society. Conversely, because ICT development and use now underlie such a wide range of economic activities, the production of reliable, quality goods and services by ICT workers with a developed sense of professionalism can contribute to the activation of economic activities. In this way, support for the construction and maintenance of an appropriately professional working environment is socially meaningful.

The following measures may be effective in supporting such a working environment for ICT workers: establishing official certification for ICT workers; forming a trade union of ICT workers across businesses; creating legislation to protect whistle blowers; and setting up social safety nets for ICT workers.

### **5 Conclusion**

In an information society, ICT workers in business organisations have power over the general public's quality of life. Thus, ICT professionals and non-professionals are responsible to the public and need to develop a professional outlook and ethical attitude in order to create and preserve a safe and reliable information society.

However, individual ICT workers are not necessarily independent and unchallenged individuals; their behaviour can be affected by stress and pressure experienced in the workplace. Accordingly, organisational as well as social measures are needed to construct an appropriately professional working environment in which ICT workers are supported in maintaining their professional ethics and outlook.

An appropriately professional working environment has practical value as well as ethical value for business organisations, and is beneficial to society. Such a working environment could constitute the basis for professionalism in ICT workers, which, in turn, would provide the basis for a safe and reliable society. The efficacy of codes of professional conduct can only be ensured through the construction of an appropriately professional working environment.

### **Acknowledgement**

This study was supported by an Academic Frontier project for private universities entitled “Global Business and IT Management: Global e-SCM”; a matching fund subsidy was provided by MEXT (the Ministry of Education, Culture, Sports, Science and Technology), 2002-2006.

## References

- Flexner, A. (1910), Medical education in the United States and Canada: a report to the Carnegie Foundation for the Advancement of Teaching, Bulletin 4, The Carnegie Foundation for the Advancement of Teaching.
- Flexner, A. (1915), Is social work a profession? Proceedings of the National Conference of Charities and Corrections, 576-590.
- Gotterbarn, D., Miller, K. and Rogerson, S. (1999), Software engineering code of ethics: approved! (Software Engineering Code of Ethics and Professional Practice, Version 5.2), Communications of the ACM, 42 (10), 102-107.
- Hodges, M. P. (2001), Does professional ethics include computer professionals? Two models for understanding, in Hester, D. M. and Ford, P. J. (eds.), Computers and ethics in the cyberspace, Prentice-Hall, 195-203.
- Huff, C. (2003), Unintentional power in the design of computing systems, in Bynum, T. W. and Rogerson, S. (eds.), Computer ethics and professional responsibility, Blackwell, 98-106.
- Johnson, D. G. (2001), Computer ethics (3rd ed.), Prentice-Hall.
- Kizza, J. M. (1998), Ethical and social issues in the information age, Springer-Verlag.
- Linderman, J. L. and Schiano, W. T. (2001), Information ethics in a responsibility vacuum, Database for Advances in Information Systems, 32 (1), 70-74.
- Murata, K. (2001), Social and ethical aspects of IT, Office Automation, 22 (3), 30-35 (in Japanese).
- Murata, K., Trust and reputation as corporate assets and information ethics, in Tohyama, A. (ed.), Post IT strategy: from ebusiness to business, Nikka Giren, 2003, 163-185 (in Japanese).
- Nissenbaum, H. (1994), Computing and accountability, Communications of the ACM, 37 (1), 73-80.
- Yamada, R. (1998), Professional school: professional education in the USA, Tamagawa University Press (in Japanese).