Editorial

Computing by everyone for everyone

Computing is no longer the sole domain of professionals, educated and trained through traditional routes to service public and private sector organisations under paid contracts. Computing has been democratised with the advent of economically accessible hardware, a multitude of software tools and the internet. Computing is by everyone for everyone. The youngest app developer at AppleWorldwide Developers Conference in June 2019 was Ayush Kumar, a 10-year-old boy who started coding when he was 4.

Much effort has been expended in the creation and dissemination of excellent codes of ethics by many professional bodies allied to computing. The adoption of, adherence to and effectiveness of such codes in practical computing have to be questioned with the continued occurrence of so many system failures and also illegal activities that occur leading to public outcry. Even though the codes of ethics exist, why is it that significant unethical activity within computing remains? IT development is a global activity about which IDC periodically produces surveys. The IDC survey of 2018 found that there were, worldwide, 18,000,000 professional software developers and 4,300,000 additional hobbyists. The combined membership of leading professional bodies, ACM, ACS, BCS and IFIP (assuming no joint memberships which in practice will not be the case), represents only 3.09 per cent of that global total. This suggests that, on the basis of statistics, professional bodies allied to computing and their adopted codes of ethics have little influence on practical computing. Of course, this argument does not take into account the nature and importance of the systems developed and who is developing them. Nevertheless, from these statistics, it is clear that a large global population needs to engage in a new form of dialogue regarding the ethics of practical computing. This might include, for example, accessible exemplars of good and bad practice, interactive case analyses of failed systems and a universal charter for computing, which would be the foundation of computing education from the start of a child's education through to becoming a computing practitioner. Codes of ethics are important, as they provide the detail on which sound computing strategies can be planned and implemented. However, to suggest, these alone can be used to resolve unethical computing practice is folly. A new approach which engages all members of society is needed. Why? Because society is now computing dependent and anyone can develop computing systems which might be used by thousands, if not millions, of people. Impacts, whether positive or negative, spread rapidly and are very difficult to reverse.

IT application, research, innovation, availability and use are affected by three types of drivers. There are top-down drivers which are typically impositions by bodies of authority which dictate where resources should be placed to achieve some overall goal. Bottom-up drivers emanate typically from grassroots collective action resulting in a widespread change. Middle-out drivers involve all those within, for example an organisation, who are empowered to initiate change, support it, propose new ideas and innovate. These drivers affect attitudes and societal norms. Indeed, the amalgam of top-down, middle-out and bottom-up drivers leads to a complex situation where the attitude and behaviour of individuals and collectives involved in IT are highly influential in the delivery of socially acceptable IT. Therefore, with each passing day, information ethics becomes more important, as it is that which steers in an ethical direction for all those involved in IT.

Millennials and post millennials, who now represent around half of the global workforce, are key bottom-up drivers because they, as citizens, have grown up with technology and

consider change as ever-present. Technology is their sixth sense. Increasingly millennials will influence the way in which society looks at IT, what is acceptable IT and what is not. The demand for more flexible working and the blurring of traditional boundaries between home and work will increase. The millennial voice must be heard and must be taken into account, for they are the future. Their information ethics education and sensitivity must be nurtured to promote socially acceptable IT.

Without practical information ethics, society is increasingly at risk from many threats. Here are just three examples.

The risk of dual use has always existed and, at times, has occurred. Free and open-source software (FOSS), like most technology, is dual use technology; it is a technology which can be used for both "good" and "evil" purposes. The enormous range of powerful FOSS software available to anyone for any purpose greatly increases dual use risks to society.

More than 50 per cent of reported crimes are related to the online world. For the criminal, cybercrime remains low risk with high return. There exist criminal alliances through which cybercrime information is shared using, for example, the Dark Web. Cybercrime is systemic and global in nature. Phishing emails and associated malware remain the greatest threat, but ransomware is rapidly increasing and denial of serviced attacks are resurgent. Cybersecurity strategies and associated actions are needed to reduce the effects of cybercrime. However, this cannot simply be a technological endeavour. Education should be a key element. This includes educating teenagers who can be lured by the perceived excitement of cybercrime, making parents aware of the dangers facing their children in the online world and training employees to identify and resist the temptation of clicking links in phishing emails.

Within industry and government, the compliance culture has taken a firm hold and so strangles the opportunity for dialogue and analysis of complex multi-faceted socio-ethical issues related to IT. Superficial compliance is dangerously unethical and must be challenged vigorously in a technologically dependent world. The time frames for IT development and IT regulation and governance are, and will always be, misaligned. By the time some control mechanism is agreed, the technology will have moved on several generations and thus what has been agreed is likely to be ineffective. This seems to be the case with the latest trend, Artificial Intelligence (AI) Governance, as there are so many opinions and vested interests causing protracted debate while AI marches onwards. Thus, it is paramount to imbue strategists, developers, operators and users with practical information ethics. In this way, ethical computing has a chance of becoming the norm.

To conclude, all those involved in computing, albeit as provider or consumer, need to have the ethical tools, skills and confidence to identify, articulate and resist unethical aspects of IT. Moreover, they should be free to challenge the decisions of and orders issued by IT leaders where those actions are ethically questionable, without detrimental effect to themselves.

Note: This short essay is to be translated into Japanese for inclusion in a forthcoming book; Kiyoshi Murata and Yohko Orito (editors) *Introduction to information ethics*. Minerva Shobo, Kyoto.

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