

## **Reflective activity - Ethics in Computing – Research Methods and Professional Practice – Michael Geiger**

The question of what constitutes ethical behaviour is primarily a philosophical question and therefore cannot be answered unequivocally. However, ethics can be seen as an expanding dimension of the law, with the aim of striving for humanistic behaviour. Ethical principles, like laws, are therefore based on a consensus of the social majority. However, while according to Bott (2014) law can be defined as “a set of rules that can be enforced in a court” and thus follows clearly defined regulations, ethics and such behaviour have no clearly defined guidelines and can differ depending on the situation. Stahl et al. (2016) names the distinction between 'right' and 'wrong' as the most general form of ethics, whereby the assessment and weighting is of a subjective nature and can therefore be differentiated individually and situational. An action can be legal from the point of view of the law, but not ethically justifiable. On the other hand, ethically correct actions may violate laws or contracts, such as employment contracts or confidentiality obligations. In contrast to laws, ethics therefore has a multidimensional structure, which can be evaluated differently by people. In addition, with regard to information technology, ethics can be viewed from a philosophical and professional perspective.

While computer ethics from a philosophical point of view is based on general computer-based ethics with the aim of exploring the technical possibilities and associated potential societal problems in the context of normative principles, professional ethics refers to the behaviour and principles of how computing professionals and stakeholders meet their responsibilities (Marturano, 2002).

From a computing professional and stakeholder point of view, applied professional ethics is therefore of particular importance, as it affects everyone involved in

computer technology and disregard for principles can lead to damage to others or even society as a whole.

Ethical behaviour and principles must be individually developed and applied in a reflective manner, however institutions such as the British Computer Society (BCS) provide basic guidelines which serve as a guide and should be considered at all times (BCS, 2022). Ethical issues are manifold and can take different forms depending on the technical implementation, with misuse of personal information as well as unclear responsibility for managing personal data and technology representing central ethical challenges, occurring in a wide variety of ways, which is to be illustrated with the help of the following examples (Zhang, 2011).

The fact that everyone involved in a project bears an ethical responsibility is shown by the Volkswagen emission scandal 2015, in which it was determined that emission values from diesel vehicles were intentionally falsified during checks (Hotten, 2015). The fraud was made possible by software that recognized controls and manipulated the emitted emissions. Here, the ethical responsibility at the various levels becomes clear. While the managers can be accused of an obvious violation of ethical principles, all hierarchical instances of the company were involved in the development and installation of this software. It can be assumed that the lower the hierarchical level, the less the purpose, extent and consequences of the software used were known. One consequence of the assumption is that with more power comes greater ethical responsibility. However, the developer of the software should have questioned the benefits and the area of application of such an application and voiced criticism.

A more striking example is the Stuxnet computer worm, which infected nuclear enrichment facilities in Iran in 2010 and destroyed uranium centrifuges (Rieger, 2010). The frequency converters affected by the attack are not only used in Iranian

uranium centrifuges, but are also installed in critical infrastructure worldwide, such as power generators in hydroelectric power plants, but also in nuclear power plants. As a result of the attack on the Iranian infrastructure, possession of the computer worm passed into unknown hands and was registered worldwide in the months and years that followed. It was only established in 2014 that the malware was also found in German nuclear power plants (Lorenz, 2016). While a serious violation of ethical principles at the highest, national level can also be determined here, this example also makes clear the explicit ethical responsibility of the programmer. The developer of the software should have known about the international danger emanating from his or her actions and accordingly should have refused the development.

These examples show what consequences can follow from the actions of a computer specialist and what ethical responsibility results from this power. As a relevant stakeholder in information technology, personal actions must be constantly reflected in an ethical context, since on the one hand unexpected consequences can follow from one's own actions and on the other hand the direct physical and mental health of people can be impaired.

It can therefore be stated that the actions of computing professionals are subject to a social responsibility that goes beyond the pure legal situation and is based on ethically reflected actions. Computing professionals must be aware of the possible consequences of their actions and actively contribute to preventing unethical measures, applications or designs that can cause potential damage. As a person participating in a project, this responsibility cannot be dismissed and transferred to superiors or clients, since ethical responsibility affects every individual and must be maintained in the interests of society.

## References:

- BCS (2022) Code of Conduct for BCS Members. Available from: <https://www.bcs.org/media/2211/bcs-code-of-conduct.pdf> [Accessed 08 November 2022].
- Bott, F. (2014) *Professional Issues in Information Technology*. London, British Computer Society. Available from: <https://ebookcentral.proquest.com/lib/universityofessex-ebooks/reader.action?docID=1511183&ppg=23> [Accessed 09 November 2022].
- Hotten, R. (2015) Volkswagen: The scandal explained. *BBC*. Available from: <https://www.bbc.com/news/business-34324772> [Accessed 10 November 2022].
- Lorenz, J. (2016) Cyber Attack on German Nuclear Power Plant. *University of Hawai'i – West O'ahu*. Available from: <https://westoahu.hawaii.edu/cyber/regional/world-news-europe/cyber-attack-on-german-nuclear-power-plant/> [Accessed 10 November 2022].
- Marturano, A. (2002) The role of metaethics and the future of computer ethics. *Ethics and Information Technology* 4(1): 71-78. Available from: <https://link.springer.com/article/10.1023/A:1015202319899> [Accessed 10 November 2022].
- Rieger, F. (2010) Der digitale Ersts Schlag ist erfolgt. *Frankfurter Allgemeine Zeitung*. Available from: <https://www.faz.net/aktuell/feuilleton/debatten/digitales-denken/trojaner-stuxnet-der-digitale-ersts Schlag-ist-erfolgt-1578889.html> [Accessed 10 November 2022].
- Stahl, B. C, Timmermans, J. & Mittelstadt, B. D. (2016) The Ethics of Computing: A survey of the computing-oriented literature. *ACM Computing Surveys* 48(5): 1-38. Available from: <https://dl-acm-org.uniessexlib.idm.oclc.org/doi/10.1145/2871196> [Accessed 08 November 2022].
- Zhang, J. (2011) *Ethical Issues in Information Systems*. *Computer Engineering and Management Sciences* 3: 321-323. Available from: <https://ieeexplore.ieee.org/abstract/document/6113649> [Accessed 10 November 2022].