ICT and sustainability: skills and methods for dialogue and policy making

Iordanis Kavathatzopoulos
Department of Information Technology, Uppsala University, Uppsala, Sweden

Received 19 December 2014
Revised 19 December 2014
Accepted 19 December 2014

Abstract

Purpose – The purpose of this paper is to present an overview and to discuss the following issues: most often, discussions about Information and communication technology (ICT) sustainability focus on environmental issues; however, there are other aspects referring to ICT internal sustainability and to its role as a tool in managing general sustainability issues. The way to handle ICT sustainability issues is also significant.

Design/methodology/approach – The paper discusses and investigates various aspects of ICT sustainability, and of methods to handle these issues and make decisions.

Findings – Classical philosophy and psychological empirical research on decision-making demonstrate the way to take care of ICT sustainability issues. This way is philosophizing, which has to be trained and supported for people and organizations involved to acquire the necessary skills and to use suitable methods.

Originality/value – The paper highlights other significant aspects of ICT sustainability rather than the environmental impact alone. It also proposes focus on the way ICT sustainability issues are handled rather than focus on normative or ideological aspects of it.

Keywords Sustainability, Autonomy, Computer ethics, IT ethics, Human–computer interaction, Ethics education

Paper type Conceptual paper

Introduction

Information and Communication Technology (ICT) is strongly related to a broad spectrum of sustainability issues: positively and negatively. Design, production, use and disposal affect significantly and increasingly environment, society and human lives. Any solution given and any policy applied have a great impact on the sustainability of nature, society and humanity. Still, it is not easy for us to find optimal solutions or agree on suitable policies. Sustainability issues are closely related to strong convictions, ideologies, business, geopolitics, etc., spoiling rigorous scientific research and confusing democratic decision-making. To handle present and future sustainability challenges related to ICT, we need to focus on developing methods and tools to support personal skills and to run political processes in ways based on them.

ICT is significant to our society today. Following that, there is a growing awareness of its importance to our life and to our future, which gives rise to a strong feeling of responsibility. We know that we have to be very cautious not to make decisions that endanger our life or our future, but rather try to find satisfying solutions to serious problems, and use ICT for the achievement of our important goals.

Journal of Information, Communication and Ethics in Society
Vol. 13 No. 1, 2015
pp. 13-18

1477-996X
DOI 10.1108/JICES-12-2014-0063

It seems that we are at a critical moment. Although humanity may have confronted critical moments several times before, for some time after industrialization, we were still able to postpone difficult decisions. Now it appears that we are at the end of this period of calm with no chance to set aside difficult decisions (Jonas, 1991). We feel that we cannot do it anymore because of the magnitude of effects of what we are doing, or of what we are failing to do. The pace of change is increasing. New technologies may establish new norms, behaviors, relationships and dependencies that we are subsequently unable to change facts, and that we are unable to change and to redirect development.

Nevertheless, we can do something about this by following the guidelines of classical philosophy and the findings of empirical research on decision-making. This is not a suggestion to re-use whatever solutions have been given to previous sustainability problems. Rather to consider the way one can best handle difficult problems by focusing on the skills and the tools we use to handle the issue of ICT sustainability.

The classical and most common approach to sustainability about ICT focuses on issues of the environment. The crucial question is whether ICT will eventually cause a large environmental catastrophe or continue to be used as usual independently of its impact on environment. A more optimistic approach is that ICT may contribute positively to the protection of the environment. But, generally, the whole issue of sustainability and ICT is strongly connected to environment (Patrignani and Whitehouse, present issue). ICT indeed has a heavy impact on environment. Building computer hardware demands a great amount of many different and special resources, running the systems consumes increasing amounts of energy and disposing of computers pollutes the environment.

Environmental aspects of ICT give rise to significant sustainability issues. Of course, we have to consider them and take our responsibility by doing the best we can about that. However, the environment is not the only issue of significance for ICT sustainability. In addition to ICT's substantial impact on resource supply, pollution and energy consumption, there are other aspects affecting sustainability. There are aspects of ICT itself. First, how it is designed and used and, second, what is ICT's effect on other aspects of our life not necessary directly connected or related to the environment. The first is about how well a system works, its flexibility and reliability. The second means how well a system is adapted to its context and how well it functions as a tool for other purposes; for example, environmental sustainability or achievement of moral goals. All these aspects have to be considered to construct usable and efficient systems that satisfy our important goals in life.

Sustainable ICT as a tool for sustainability

An ICT system has to be adapted to the way users think, perceive and act. They have also to be adapted to the way users are organized and to the way they work. Systems which lack usability or with low usability do not function properly and they do not deliver the value expected to be delivered when they were originally designed. ICT systems have to be built in such a way as to be resistant to the stress they are exposed to in real-life use. Systems crash unexpectedly and more often than is expected. ICT systems have to be stable, secure and reliable. Of course, all systems have problems with that and a certain level of vulnerability is accepted, but if it is shown that efforts made to reach an acceptable level of control are not fruitful, the system will be abandoned. The

sustainability of ICT systems is also dependent on how trustworthy it is from a technological or management point of view.

We also need systems that are flexible and easy to develop further to adapt to new and changing conditions and demands. Sustainable ICT systems have to be constructed in a way that makes it possible for them to accept changes introduced by designers or users any time during the life of the system.

Another important precondition for the achievement of internally or externally sustainable ICT systems is that the users themselves are engaged in the development of the system they will use. How to design a system has to be found in a dialogue and negotiation process together with the future users of the system. This process has to be well-structured in a way that facilitates and supports a fruitful contribution of the users and a good cooperation between users, designers and purchasers. Users need the skills to identify, express, evaluate and negotiate alternative design solutions, and critically investigate them from the point of their real needs. This process of participation has to be established, maintained and managed in a sustainable way, which is a precondition to produce usable ICT systems.

The world does not consist of computers only. The world of humans and nature and the world of real life should not be overlooked. ICT systems are supposed to exist to serve our lives in the real world. But there is some concern about how they do it and what is their longitudinal impact on the sustainability of the world. Will ICT help us to sustain our way of life and what we are as biological beings, or will it eventually change everything to something we do not want and we cannot control?

Certainly, ICT affects our social life and the way we associate, communicate and cooperate with each other. Without any doubt, ICT plays a significant role in recent political developments and changes. It has a strong impact on property issues, on how the market works and on economic relations as a whole. But are these changes sustainable in terms of the way we want to live, socially, politically and economically?

Regarding biological sustainability and independently of what the "real" nature of humans is, ICT can affect it, and that may happen much sooner than we expect. ICT is now developing very fast and computers can support our decision-making in even better ways. Then, it is obvious that we have got the "possibility" or the "risk" to receive much better advice. If technological progress continues, in the future, computers will be able to give us advice that will outstrip the quality of anything humans may come up with. It would then be very difficult not to accept such advice. But will we let the computers decide for us? (Kurzweil, 2005).

Philosophical skills and methods

If we look at the problems ICT sustainability and ethics focus on, we can easily see they are similar in many different ways. Constructing and running effective and efficient systems is a main challenge in ICT, but how to succeed with that is not at all simple and, rather often, is not even understood as a problem by the people involved. Evidently, there is no obvious answer to the design and use problems. Of course there are valid general principles, for example, on how to design usable ICT systems, but the concrete features of a system have to be decided during the systems development process, separately for each new system and in accordance to prevailing conditions. Furthermore, there are several "right" solutions to each design problem, as well as to the way one should implement or use a system. There are always many different ideas on

how to do all this the best way, depending on the priorities of different groups such as users with varying needs or skills, budget frames and design concerns (Winograd, 1997).

In a similar way, there is no generally accepted truth about issues of sustainability. In general, terms most of us do agree on what should be done to sustain our environment or our way of life (for example, Earth Charter, 2011). But when we move closer to concrete projects like road construction, location of production plants and the like, conflicting opinions or dilemmas take over. Often, most of the arguments are based on very good sustainability grounds, although they are not compatible with each other. Eventually, we will stand in front of the same problem as the one in ICT design, i.e. to find a solution that works with the concrete project at hand and which may differ to the solution belonging to another project.

There is no lack of general principles in ethics either. Moral principles are something we all have and in which we believe, some more strongly than others. But, although many people agree on the same principle, applying it to reality may cause disagreement. Even people who follow the same religion or political ideology disagree sometimes about what is the right interpretation of high principles and what would be the ideologically or religiously right action. Again, as in the issues of ICT and sustainability, there is no given answer and we have to find a working solution for the problem at hand (Rachels and Rachels, 2007; Tavani, 2011).

The handling of values in relation to ICT sustainability and ethics is the main reason for the strong affinity between them. Whereas this is obvious regarding ethics, in sustainability issues, we cannot see it with the same clarity. When we try to find sustainable policies, we may discuss it in technical terms, although this language actually represents values. Strictly speaking, it does not make sense if we do not refer to what is important and to what we want, in reality referring to principles and values. It is even more difficult to recognize the great importance of values and the role they play in the process of ICT systems development and use. Design solutions or ways to manage and use ICT systems are ultimately based on value judgments (Cocton, 2009; Friedman *et al.*, 2008).

All of this points to the significance of the method or of the process involved in finding answers and solutions. ICT sustainability and ethics share the weakness of their general principles to provide automatically concrete solutions. Because no answers to concrete problems are given in any of the three areas, the way we try to find solutions, apply basic principles, identify goals and formulate guidelines emerges as the most important thing to focus on. Yet, this is easier to state than to practice in reality. The problem is that we want to come straight to the answer. Occupying our mind by reflecting on what would be the right method to use and how to use it properly while standing in front of a pressing problem does not seem to be our priority. Neither are we prepared to spend time and resources to make sure that we really keep control of the situation, that we try to be self-critical and that we investigate the situation in a systematic way. Most often, we react using our reflexes or we blind ourselves with shining principles, strong ideologies or unquestioned beliefs (Sunstein, 2005).

Focusing on the method and making sure that the right way of proceeding has been adopted is the way to get satisfactory answers to the problems of ICT sustainability and ethics. This is the process of philosophizing: dialogue both on personal and group levels.

However, this process does not appear automatically. It demands experience, training and support (Habermas, 1988).

Conclusion

Indeed there is reason for concern about our future. There are unavoidable questions about what would be good for us and what would be harmful. We are facing some serious ethical issues caused by the current and future impact of ICT on our life. Actually, ethics is an inseparable part of ICT and it has always been. Already, from the beginning, ICT affected important values, but now its impact is clear to everybody, both in a positive and in a negative sense. ICT creates new possibilities to solve difficult problems and facilitates the achievement of important goals for humanity. Still, at the same time, it gives rise to big new risks and it threatens important values.

Sustainability is not only related to environmental issues. As far as ICT is concerned, systems have to work in harmony with the way users perceive, think and make decisions; and with the way persons, groups and organizations work. Systems have to be stable and reliable, as well as flexible to adapt to changes and to change themselves. ICT systems that do not satisfy the above conditions are not sustainable in themselves and cannot function as tools for sustainable solutions to other problems. ICT and sustainability are connected to each other, and ethics too. Ethics in our time is dominated by issues of ICT and sustainability.

ICT sustainability issues have emotional, psychological, biological, social, economic, political, ideological and moral significance; therefore, they have scientific importance. Consideration of these problems is unavoidable; we have to act carefully and use the right way to achieve the best solutions. But we need to know how to do this.

Because of that, the method is what we should focus on. Given the nature of the ICT sustainability issues and the difficulty to find ready-made answers to real-life problems, the way one handles the problems is the key. Philosophy has analyzed this issue in depth and it has given us the philosophical method as the means to finding satisfying solutions. Psychology has shown in empirical research what skills are necessary for this purpose. Issues of ICT sustainability and ethics are very important for us today, and we have the basic tools to take care of them, but we need more effort to adapt the tools and to develop our skills.

With classical and modern philosophy as a foundation, and based on psychological research on ethical decision-making, it is suggested to focus on the way to take care of issues rather than on normative or ideological aspects. The method we use to handle problems in these areas is of crucial importance.

References

Cocton, G. (2009), "Getting there: six meta-principles and interaction design", *CHI '09: Proceedings of the 27th International Conference on Human Factors in Computing Systems, ACM, New York, NY*, pp. 2223-2232.

Earth Charter (2011), "The earth charter initiative", available at: www.earthcharterinaction.org/content/ (accessed 14 December 2014).

Friedman, B., Kahn, P.H. Jr and Borning, A. (2008), "Value sensitive design and information systems", in Himma, K.E. and Tavani, H.T. (Eds), *The Handbook of Information and Computer Ethics*, Wiley, Hoboken, NJ, pp. 69-101.

Habermas, J. (1988), *Kommunikativt handlande*, Daidalos, Göteborg.

Jonas, H. (1991), *Ansvarets princip: Utkast till en etik för den teknologiska civilisationen*, Daidalos, Göteborg.

Kurzweil, R. (2005), *The Singularity is Near*, Viking Adult, New York, NY.

Patrignani, N. and Whitehouse, D. (Present issue).

Rachels, J. and Rachels, S. (2007), *The Elements of Moral Philosophy*, McGraw-Hill, Boston, MA.

Sunstein, C.R. (2005), "Moral heuristics", *Behavioral and Brain Sciences*, Vol. 28 No. 4, pp. 531-573.

Tavani, H.T. (2011), *Ethics and Technology: Controversies, Questions and Strategies for Ethical Computing*, Wiley, Hoboken, NJ.

Winograd, T. (1997), "From computing machinery to interaction design", in Denning, P. and Metcalfe, R. (Eds), *Beyond Calculation: The Next Fifty Years of Computing*, Springer-Verlag, Amsterdam, pp. 149-162.

Further reading

UN (2011), The Universal Declaration of Human Rights, United Nations, New York, available at: www.un.org/en/documents/udhr/ (accessed 14 December 2014).

Corresponding author

Iordanis Kavathatzopoulos can be contacted at: iordanis@it.uu.se