Ethically Intelligent? A Framework for Exploring Human Resource Management Challenges of Intelligent Working Environments

Céline Ehrwein Nihan[1] and Katharina Kinder-Kurlanda[2]

[1] University of Applied Sciences in Business and Engineering Vaud (HEIG-VD),
Av. des Sports 20, CH-1401 Yverdon-les-Bains, Switzerland
celine.ehrwein@heig-vd.ch
[2] GESIS Leibniz-Institut für Sozialwissenschaften,
Unter Sachsenhausen 6-8, 50667 Köln, Germany
katharina.kinder-kurlanda@gesis.org

Abstract. With advances in the development of intelligent environments (IEs) social scientists and ethicists have begun to gauge the social impact of the diverse emerging technology assemblages and to work with developers and stakeholders in order to improve design and deployment of such technologies. Research conducted to better understand specific socio-technical settings faces multiple challenges due to the complexity of most scenarios, making it imperative to approach the attempt of understanding IEs both from multi-disciplinary perspectives and to include practitioners and managers of IEs. In this paper we introduce our framework for setting up a competence center (CC) for defining and managing socio-ethical challenges of intelligent *working* environments (IWEs). We detail practical steps to successfully build a CC in order to allow other research projects to adopt some of these steps or the whole framework to positively anticipate and manage socio-ethical challenges of IWEs.

1 Introduction and Problem Setting

Currently numerous research projects are being conducted in the field of Information and Communication Technology (ICT) in order to develop environments which can record, analyse and handle ambient data from diverse sources and which are intended to meet the needs of their users automatically, in due time, and in a personalized and intelligent manner [3, 12]. These efforts are expected to radically transform our perception of reality and the organization of our everyday life [7], including the organization of work. In particular, intelligent environments (IEs) may be used by companies for managerial purposes providing accurate, real-time information. IEs can be integrated into workplaces to measure and improve employees' working conditions, well-being and performance, and, last but not least, to optimize the organizations' productivity.

Studies related to new intelligent working environments (IWEs) have focused on technical difficulties [14], or on the implications of ubiquitous computing for knowledge management [11]. Scholars have sketched scenarios of the future

A. van Berlo et al. (Eds.): *Ambient Intelligence – Software & Applications,* AISC 219, pp. 213–219.
DOI: 10.1007/978-3-319-00566-9_27

workplace [2], have conducted studies on the acceptance of IWEs [13], and have highlighted possible organizational issues [1]. The specific question of the ethical and human resource (HR) management issues raised by IEs in the workplace has not yet been explored. This gap is all the more striking since the first applications related to the workplace are arriving on the market[1]. Yet, neither employees nor (HR) managers seem to be sufficiently aware of the radical changes that are occurring and of their own role in the implementation of these developments. Furthermore, the socio-political impact of these new technologies and questions of whether and how to adapt legal frameworks to the development of IWEs are starting to be assessed. An interdisciplinary examination of these issues with scholars and professionals is urgent if we want to anticipate, support and frame the technological developments to come.

2 General Objectives and Expected Outcomes

With the perspective outlined in the previous section in mind, we have started a project with the following aims:

- The exploration of the socio-ethical and HR issues raised by the arrival of IEs in the workplace;
- The raising of awareness in (HR) managers and designers of work environments with respect to IWE challenges, and;
- The elaboration of tools intended to help (HR) managers to take part in the developments in an active and constructive manner.

In the short term we expect to develop recommendations to (HR) managers and environment designers with regards to developing strategies and measures for organizations to meet the ethical and HR challenges of IWEs. We also seek the integration of findings into graduate and postgraduate teaching programs in order to raise awareness in engineering and management students of the challenges they will face. *In the long term* we aim to develop further interdisciplinary projects related to the design of IWEs and to support the elaboration of recommendations for political authorities.

3 Methodology

Defining challenges of IWEs requires thinking about how such a definition process can be accomplished. In the following section we first show the methodological challenges we faced in our project, then present building a competence center (CC) as a solution to these challenges, and finally explain the main steps completed since the project was initiated at the end of 2011[2].

---

[1] See for example the 3D job interviews simulator developed by the Centre de réalité virtuelle de Clermont-Ferrand and the consulting company Athalia (`www.aprv.eu`) or the intelligent fireman hood developed by the firm Bodysens (`www.bodysens.com`).

[2] The project was initiated by Céline Ehrwein Nihan from of the Human Resources and Management Unit of the University of Applied Sciences in Business and Engineering Vaud (HEIG-VD) and Bernard Baertschi of the Institute for Biomedical Ethics of the University of Geneva.

3.1 Requirements and Challenges

Deployment of an Interdisciplinary Perspective

Often the decision to implement IWEs in companies is in the hands of top management and HR departments. However, IWEs do not solely concern (HR) managers. The rise of ubiquitous computing in the workplace implies a *wide variety of stakeholders* (certainly managers, but also workers, engineers, designers, etc.), who make sense of technologies from various viewpoints and who pursue different – and sometimes conflicting – interests [8, 10]. Furthermore, many ethical and legal issues, such as power balance, patent law, the right to privacy, accountability, etc., which come into play with IWEs [1, 5, 9], put at stake *socio-ethical regulations and axiological frameworks that go far beyond companies*. Finally, the development of IWEs involves *fundamental cultural as well as anthropological changes* [4, 7]. In other words, the settings of IWEs are complex: they raise managerial, epistemological, socio-technical and socio-ethical challenges. Handling the complexity of these challenges should neither be bound by disciplinary concerns nor be assumed solely on the level of individual actors' personal ethical obligations. This *implies an interdisciplinary perspective and a shared responsibility*. Our intention is to make such an interdisciplinary exchange possible and to support (HR) managers and environment designers to face future challenges.

Development of Cross-Institutional Collaborations

One of the risks related to research of future IWE developments lies in the emergence of a gap between scholarly reflections and the needs and expectations of companies and professionals [10]. This gap may compromise the relevance of research initiatives. Therefore it is essential to ensure a dissemination of research results in academic communities as well as amongst professionals in order to *facilitate comprehension and implementation* of our work. Bridging the gap between researchers and practitioners is all the more important as many IWE applications are only now emerging. Both practitioners' and developers' perspectives are required to anticipate new challenges. Thus, to prevent *the risk of being cut off from professional realities and practices* we maintain a strong connection with companies and (HR) managers.

Setting of a Common Research Structure

Interdisciplinary work and cross-institutional collaborations are daring undertakings. There is a risk of profound epistemological misunderstandings amongst scholars with different backgrounds as well as of misunderstandings between academics and practitioners. Therefore the *setting of a common structure for the research* is essential. *Institutionalised long term relations* among both scholars and professionals need to be established. It is also necessary to develop a *shared methodology* to guarantee and improve the focus of the research group in the long term. Facing these challenges we decided to work, towards building a CC, based in Switzerland but with an international outlook.

3.2 Building a Competence Center

The CC includes researchers and practitioners from various fields and disciplines and is intended to enhance the quality, visibility and accessibility of the project and its results. In the following section we outline our framework for building a CC by detailing the individual steps taken.

Steps Taken to Ensure an Interdisciplinary Perspective

One of the first steps was to gather scholars from different academic fields who were experienced and interested in intelligent technologies and who represented a variety of renowned research centers and university departments[3]. We recruited specialists who between them covered a wide range of fields, among them anthropology of technology; biotechnology and nanotechnology; corporate and HR management; bioethics, social ethics and ethics of politics; patents and new technology law; sociology of work; and science and technology studies. We then established a scientific and organisational committee at the core of the CC to be in charge of the direction and implementation of the project. The composition of the committee met the demands of interdisciplinarity.

Steps Taken to Ensure Cross-Institutional Collaborations

In June 2012, the Human Resources and Management Unit of the HEIG-VD, which first launched the project, was invited by the Association for Human Resources Management (HR-Vaud) for a conference on the theme of smart technologies[4]. This meeting allowed for an assessment of the relevance of the topics for professionals [6]. A partnership was concluded between HR-Vaud and the project committee. Two HR managers actively participate in the research project and the association supports the dissemination of project results among professionals.

With the aim of an expansion of the project to a broader societal horizon two centers for technology assessment (TA-Swiss in Switzerland and Rathenau Institute in the Netherlands) specialized in public participation methods and in the elaboration of recommendations for political authorities were invited to join the research group.

At the present time discussions for an implementation test in a company are ongoing, which involve the project committee, the HR department of a multinational company and two research centres developing IE applications. We expect these discussions to offer a common case study application, also intended to focus the research.

Steps Taken to Ensure the Setting of a Common Research Structure

The time frame of the project was set as a three year period at the end of which the CC will be fully operational. To ensure the collaboration of people with different academic backgrounds and perspectives through a focused structure we combined three different methods of collaboration:

---

[3] For example, Institute for Social Sciences of the University of Lausanne, Institute for Information and Communication Technologies of the HEIG-VD, etc.

[4] A short version of this conference contribution was also presented in October 2012 at the Swiss Exposition for Human Resource Management: `www.salon-rh.ch`

- Interdisciplinary workshops (1-2 days every 5 months) to establish the framework and the main lines of the research;
- Individual work to allow each scholar to deepen specific problems and to conduct field investigations;
- Discussions with (HR) managers to guarantee the integration of practitioners' needs and expectations throughout the process.

The workshops were carefully prepared (establishment of a program, clear cut objectives and instructions) by the committee members and participants were requested to submit work in advance as a basis for the discussion. One or two participants would also be invited to present a paper related to their individual research in order to gain momentum for the discussion. Each workshop resulted in a report. During the workshops the committee members would pay particular attention to the interdisciplinarity of the discussion (e.g. speaking slots), the achievements of the pre-defined objectives and the integration of the points of agreement/disagreement in the workshop reports.

In addition, an on-line platform was created to allow the project members to share information required for the research. This platform is being used as support for a project database.

4 First General Outcomes and Steps to Take in the Future

4.1 First General Outcomes

The research group met twice during the first half of 2012 to assess the relevance of the research topic, to define general objectives and to determine the common methodology. In addition to the points mentioned above (see 3.2), the first main outcomes are:

- Elaboration of a common definition of IWEs[5];
- Clarification of the degree of involvement in the project realisation for each group member;
- Establishment of a list of research interests studied in the project;
- Establishment of criteria for the selection of applications to be studied in interdisciplinary research;
- Selection of two applications representative of IWEs and their related ethical and managerial issues[6].

With regards to the success of the measures taken to ensure an interdisciplinary perspective and cross-institutional collaboration we found the workshops with their specific aim of allowing all present viewpoints to be heard to be the most effective

[5] The definition which has been elaborated is: "Working environments fitted with ubiquitous computing system(s), often imperceptibly, which records, integrates, correlates and analyzes ambient data from diverse sources and is intended to meet the needs of the stakeholders automatically, in due time and in a personalized and intelligent manner."

[6] The selected applications relate to health care management and to clothing with sensors.

tool in facilitating a collaboration between people who may not normally have interacted with each other. Translating the workshop discussions into results became possible through the mix of individual, small-group and large-group activities. However, we find room for improvement in this translation process: In hindsight we think we may have underestimated the necessity of keeping questions more closed and result-oriented rather than open and explorative. The latter, while necessary in early phases of the project, can later on lead to questions being raised repeatedly and to continued discussions of the *mode* of discussion. Therefore, we are aiming to keep an even closer eye on carefully defining the intended results of every activity to ensure measureable progress with the project.

4.2 Main Steps to Take in the Future

While the project is still in its first stages, we intend to pursue it through further organization of workshops, individual work and discussions between scholars and (HR) managers. These are expected to result in an interdisciplinary definition and analysis of a) global socio-ethical issues of IWEs, b) ethical issues for (HR) managers and IWE designers in particular and, c) HR management issues, all indispensable prerequisites to the development of relevant recommendations to (HR) managers and IWEs designers. Having developed these recommendations, the CC will be in a position to establish a roadmap for the development of further projects. For example, we plan the organization of a civic forum on IWEs in order to support the elaboration of recommendations to political authorities.

5 Conclusion

In this paper we have shown how we are building a CC to engender interdisciplinarity, cross-institutional collaboration and a common research structure in order to facilitate timely and relevant research of the socio-ethical issues that (HR) managers and designers face with regards to IWEs. We have introduced the framework that facilitates the research. Our aim in this is to allow other projects to implement our framework, or parts of it, in order to include an exploration of socio-ethical issues in their own projects.

References

1. Boos, D., Guenter, H., Grote, G., Kinder, K.: Controllable Accountabilities The internet of things and its challenges for organisations. Behav. & Inf. Technol., 1–19 (2012)
2. Bühler, C.: Ambient intelligence in working environments. In: Stephanidis, C. (ed.) UAHCI 2009, Part II. LNCS, vol. 5615, pp. 143–149. Springer, Heidelberg (2009)
3. Corchado, J.M., Bajo, J., de Paz, Y., Tapia, D.I.: Intelligent environment for monitoring alzheimer patients, agent technology for health care. Decis. Support Syst. 44, 382–396 (2008)
4. Dourish, P., Bell, G.: Divining a digital future. Mess and mythology in ubiquitous computing. MIT Press, Cambridge (2011)

5. Nihan, C.E.: Intelligent working environments, handling of medical data and the ethics of human resources. In: Omatu, S., Paz Santana, J.F., González, S.R., Molina, J.M., Bernardos, A.M., Rodríguez, J.M.C. (eds.) Distributed Computing and Artificial Intelligence. AISC, vol. 151, pp. 429–436. Springer, Heidelberg (2012)
6. Ehrwein Nihan, C., Firoben, L., Gonin, F., Hitz, M., Weidmann, J.: Les technologies intelligentes un risque ou une opportunité pour la GRH?, HR-Vaud, Lausanne (2012)
7. Floridi, L. (ed.): The Cambridge handbook of information and computer ethics. Cambridge University Press, Cambridge (2010)
8. Habermas, J.: Erkenntnis und Interesse. Merkur 213, 1139–1153 (1965)
9. Kinder, K.E., Ball, L.J., Busby, J.S.: Ubiquitous computing, cultural logics and paternalism in industrial workplaces. Poiesis Prax 5(3-4), 265–290 (2008)
10. Kujala, S.: Effective user involvement in product development by improving the analysis of user needs. Behav. & Inf. Technol. 27(6), 457–473 (2012)
11. Patten, K., Passerini, K.: From personal area network to ubiquitous computing: preparing from a paradigm shift in the workplace. In: Proceedings of the IEEE Wireless Telecommunications Symposium 2005, pp. 225–233 (2005)
12. Ramos, C., Marreiros, G., Santos, R., Freitas, C.F.: Smart offices and intelligent decision rooms. In: Nakashima, H., Aghajan, H.K., Augusto, J.C. (eds.) Handbook of Ambient Intelligence and Smart Environments, pp. 851–880. Springer, Heidelberg (2010)
13. Röcker, C.: Acceptance of future workplace systems: how the social situation influences the usage intention of ambient intelligence technologies in work environments. In: Proceedings of the 9th International Conference on Work with Computer Systems, WWCS 2009, CD-ROM (2009)
14. Sousa, J.P.: Foundations of team computing. Enabling end users to assemble software for ubiquitous computing. In: Proceedings of the 2010 International Conference on Complex, Intelligent and Software Intensive Systems, CISIS 2010, pp. 9–16. IEEE Computer Society, Washington DC (2010)