



HAL
open science

Human Work Interaction Design: Work Analysis and Interaction Design Methods for Pervasive and Smart Workplaces

José Abdelnour Nocera, Barbara Rita Barricelli, Arminda Lopes, Pedro Campos, Torkil Clemmensen

► To cite this version:

José Abdelnour Nocera, Barbara Rita Barricelli, Arminda Lopes, Pedro Campos, Torkil Clemmensen. Human Work Interaction Design: Work Analysis and Interaction Design Methods for Pervasive and Smart Workplaces: 4th IFIP 13.6 Working Conference, HWID 2015, London, UK, June 25–26, 2015. José Abdelnour Nocera; Barbara Rita Barricelli; Arminda Lopes; Pedro Campos; Torkil Clemmensen. AICT-468, 2015, IFIP Advances in Information and Communication Technology, 978-3-319-27047-0. 10.1007/978-3-319-27048-7. hal-01371624

HAL Id: hal-01371624

<https://inria.hal.science/hal-01371624>

Submitted on 26 Sep 2016

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Editor-in-Chief

Kai Rannenber, Goethe University Frankfurt, Germany

Editorial Board

Foundation of Computer Science

Jacques Sakarovitch, Télécom ParisTech, France

Software: Theory and Practice

Michael Goedicke, University of Duisburg-Essen, Germany

Education

Arthur Tatnall, Victoria University, Melbourne, Australia

Information Technology Applications

Erich J. Neuhold, University of Vienna, Austria

Communication Systems

Aiko Pras, University of Twente, Enschede, The Netherlands

System Modeling and Optimization

Fredi Tröltzsch, TU Berlin, Germany

Information Systems

Jan Pries-Heje, Roskilde University, Denmark

ICT and Society

Diane Whitehouse, The Castlegate Consultancy, Malton, UK

Computer Systems Technology

Ricardo Reis, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

Security and Privacy Protection in Information Processing Systems

Yuko Murayama, Iwate Prefectural University, Japan

Artificial Intelligence

Tharam Dillon, Curtin University, Bentley, Australia

Human-Computer Interaction

Jan Gulliksen, KTH Royal Institute of Technology, Stockholm, Sweden

Entertainment Computing

Matthias Rauterberg, Eindhoven University of Technology, The Netherlands

IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is about information processing may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

More information about this series at <http://www.springer.com/series/6102>

José Abdelnour Nocera · Barbara Rita Barricelli
Arminda Lopes · Pedro Campos
Torkil Clemmensen (Eds.)

Human Work Interaction Design

Work Analysis and Interaction Design
Methods for Pervasive and Smart
Workplaces

4th IFIP 13.6 Working Conference, HWID 2015
London, UK, June 25–26, 2015
Revised Selected Papers

Editors

José Abdelnour Nocera
University of West London
London
UK

Barbara Rita Barricelli
Università degli Studi di Milano
Milan
Italy

Arminda Lopes
Madeira Interactive Technologies Institute
Funchal
Portugal

Pedro Campos
Madeira Interactive Technologies Institute
Funchal
Portugal

Torkil Clemmensen
Copenhagen Business School
Frederiksberg
Denmark

ISSN 1868-4238 ISSN 1868-422X (electronic)
IFIP Advances in Information and Communication Technology
ISBN 978-3-319-27047-0 ISBN 978-3-319-27048-7 (eBook)
DOI 10.1007/978-3-319-27048-7

Library of Congress Control Number: 2015955368

Springer Cham Heidelberg New York Dordrecht London

© IFIP International Federation for Information Processing 2015

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media
(www.springer.com)

Preface

Human Work Interaction Design (HWID) was established in September 2005 as the sixth working group (WG 13.6) of the IFIP Technical Committee 13 on Human–Computer Interaction (HCI). The scope of this group is the analysis and interaction design of a variety of complex work and life contexts found in different business and application domains. For this purpose, it is important to establish relationships between extensive empirical work domain studies and HCI design. WG 13.6 aims to provide the basis for an improved cross-disciplinary cooperation and mutual inspiration among researchers from the many disciplines that by nature are involved in deep analysis of a work domain. Complexity is hence a key notion in the activities of this working group, but it is not a priori defined or limited to any particular domains. WG 13.6 initiates and fosters new research initiatives and developments, as well as an increased awareness of HWID in the HCI curriculum.

This volume presents chapters developed from papers presented at the 4th HWID working conference held at the University of West London during June 25–26, 2015. The theme of this conference was on the integration of work analysis and interaction design methods for pervasive and smart workplaces.

Pervasive and smart technologies have pushed workplace configuration beyond linear logic and physical boundaries. As a result, workers’ experience of and access to technology is increasingly pervasive, and their agency is constantly reconfigured. While in certain areas of work this is not new (e.g., technology mediation and decision support in air traffic control), more recent developments in other domains such as health care (e.g., augmented reality in computer-aided surgery) have raised challenging issues for HCI researchers and practitioners. The question now is how to improve the quality of workers’ experience and outputs?

The chapters in this book focus on answering this question to support professionals, academia, national laboratories, and industry engaged in human work analysis and interaction design for the workplace. The first section provides an overview as well as instances of what could be classed as HWID methodologies. The second section offers different experiences on conceptualizing and researching the work environment in terms of how to sense and integrate its different dimensions into interaction design. The last section of the book presents chapters providing examples of HWID application in pervasive and smart workplaces across various domains such as aviation, education, product design, and archeology.

We hope this book becomes a resource for the type of discussion around HWID topics that took place at the working conference in London.

November 2015

José Abdelnour Nocera
Barbara Rita Barricelli
Arminda Lopes
Pedro Campos
Torkil Clemmensen

Organization

Organizing Committee

José Abdelnour Nocera	University of West London, UK
Pedro Campos	University of Madeira, Portugal
Torkil Clemmensen	Copenhagen Business School, Denmark
Dinesh Katre	Centre for Development of Advanced Computing (C-DAC), Pune, India
Arminda Lopes	Instituto Politécnico de Castelo Branco, Portugal
Effie Law	University of Leicester, UK
Barbara Rita Barricelli	Università degli Studi di Milano, Italy

Program Committee

Catherine Burns	University of Waterloo, Canada
Paola Amaldi	University of Hertfordshire, UK
Sergio España	Universidad Politécnica de Valencia, Spain
William Wong	Middlesex University, UK
Anirudha Joshi	Indian Institute of Technology, India
Anant Bhaskar Garg	HaritaDhara Research Development and Education Foundation, India
Ganesh D. Bhutkar	Vishwakarma Institute of Technology, India
Ebba Þóra Hvannberg	University of Iceland, Iceland
Ignacio Panach	Universidad de Valencia, Spain
Nathalie Aquino	Universidad Católica de Asunción, Paraguay
Frederica Gonçalves	University of Madeira, Portugal
Ali Gheitani	University of West London, UK
Stefano Valtolina	Università degli Studi di Milano, Italy

Sponsors

IFIP International Federation for Information Processing
University of West London
M-ITI – Madeira Interactive Technologies Institute
Copenhagen Business School
SnitkerGroup

Sources of Support

Copenhagen Business School

Contents

Methodologies

Human Work Interaction Design: An Overview	3
<i>Frederica Gonçalves, Pedro Campos, and Torkil Clemmensen</i>	
Reflections on Design-Based Research: In Online Educational and Competence Development Projects	20
<i>Rikke Ørngreen</i>	
Insights from User Experience Research in the Factory: What to Consider in Interaction Design	39
<i>Daniela Wurhofer, Verena Fuchsberger, Thomas Meneweger, Christiane Moser, and Manfred Tscheligi</i>	
User-Created Personas – A Micro-cultural Lens into Informal Settlement’s Youth Life	57
<i>Daniel G. Cabrero, Heike Winschiers-Theophilus, and Hedvig Mendonca</i>	

Environment

Pervasive Technologies for Smart Workplaces: A Workplace Efficiency Solution for Office Design and Building Management from an Occupier’s Perspective.	73
<i>Maria Ianeva, Stéphanie Faure, Jennifer Theveniot, François Ribeyron, Cormac Crossan, Gilles Cordon, and Claude Gartiser</i>	
From Bottom-up Insights to Feature Ideas: A Case Study into the Office Environments of Older Knowledge Workers.	83
<i>Valentin Gattol, Jan Bobeth, Kathrin Röderer, Sebastian Egger, Georg Regal, Ulrich Lehner, and Manfred Tscheligi</i>	
Characterizing the Context of Use in Mobile Work	97
<i>Heli Väättäjä</i>	
From Transactions to Relationships: Making Sense of User-Centered Perspectives in Large Technology-Intensive Companies	114
<i>Petra Björndal, Elina Eriksson, and Henrik Artman</i>	

Specific Contexts

Human Work Interaction Design of the Smart University 127
José Abdelnour-Nocera, Samia Oussena, and Catherine Burns

Contextual Personas as a Method for Understanding Digital
Work Environments. 141
Åsa Cajander, Marta Larusdottir, Elina Eriksson, and Gerolf Nauwerck

The Work and Workplace Analysis in an Elderly Centre
for Agility Improvement 153
Arminda Guerra Lopes

A Multi-Perspective View on Human-Automation Interactions in Aviation . . . 168
Monica Samantha Quercioli and Paola Amaldi

Designing a Demonstrator Virtual Learning Environment to Teach the
Threshold Concept of Space Syntax: Seeing from the User’s Perspective 180
*Judith Molka-Danielsen, Mikhail Fominykh, David Swapp,
and Anthony Steed*

Participatory Action Design Research in Archaeological Context. 192
*Barbara Rita Barricelli, Stefano Valtolina, Davide Gadia,
Matilde Marzullo, Claudia Piazzi, and Andrea Garzulino*

Contextual Design of Intelligent Food Carrier in Refrigerator:
An Indian Perspective 212
Pritam Kale, Ganesh Bhutkar, Virendra Pawar, and Nikhil Jathar

Author Index 227