Preface

OVERVIEW

Software development is primarily a human activity. It is a process that requires the use of latest methodologies to develop a robust design and the use of the latest technologies to implement the design to construct the final software products that are fit for the intended consumption. Since the software is developed by people for the consumption of people, the consideration of human factors in an important element within the entire process. Appropriate implementation of such factors can help to ensure that the final product meets the desired requirements. Although newer tools and techniques for the development of software has resulted in increased productivity of developers and reduction in development costs, working in large teams, which is necessarily required for large software engineering projects, is still problematic. Although the time and cost estimation techniques have improved considerably, the influence of environmental factors and inherent complexity of large software development is still resulting in systems being over-budgeted and delivered late. Although consideration of human factors is involving newer management techniques, psychology of group dynamics, methods of team motivation, and systems of rewards, when dealing with highly skilled independent-minded professionals, interaction is not easy. Understanding of relevant human factors and correct implementation of these is therefore imperative to have the correct impact so that the software continues to be designed and constructed with embedded high quality that fully satisfies consumer requirements.

This book, *Human Factors in Software Development and Design*, is a reference text. It is a collection of 15 chapters, authored by 26 academics and practitioners from around the world. These contributions in this book aim to present practice reports, discussions, inherent issues, implementation strategies, latest research, as well as case studies from around the world focusing on the human factors aspect of software design and development.

BOOK OBJECTIVE

The aim of *Human Factors in Software Development and Design* is to publish high quality original research contributions on the specialized theme of human factors in software design and development processes. Specific objectives include the following:
• Reporting state of the art in the area of human factors with respect to software development.
• Disseminating the elements of good practices suggested and practices by researchers and practitioners in the field.
• Considering all relevant aspects of software development processes in relation to implications for human cognitive limits.
• Reporting and discussing strategies for improving software quality.
• Reporting case studies, best practices, and guidelines for technology design in this specialized area.

Readers, especially the software developers, researchers, and students of software engineering, will find it a useful text as it adds to the body of knowledge in the area of software user interface, human computer interaction, and human factors.

TARGET AUDIENCES

This volume is a reference text aimed at the following audiences:

• Software developers and computing practitioners interested in user interface design and related human factors
• Project managers interested in user involvement in the software engineering processes
• Researchers and students of human factors and user interface design interested in furthering their understanding of the subject.

BOOK ORGANIZATION

There are 15 chapters in this text. These are organized in three Sections as follows:

• **Introduction:** This consists of five chapters. The first chapter focuses on socio-economic factors relating to global software development, whereas the second chapter discusses innovations in the ICT as used in the public administration. The third contribution in this section is about the user involvement in the software production for tablet devices, and the next chapter presents a case study on e-government development. The final chapter looks into the success factors for open source projects.

• **User-Centered Design:** This section comprises seven chapters. The first chapter, which is Chapter 6 in the book, presents a case study on user-centered design processes, while the next chapter focuses on the management of situational awareness with respect to design-use processes of complex systems. The next two contributions provide a descriptive study of a games design workshop and the use of wikis for agile software development. The fifth contribution in this section discusses a semantic approach for multi-agent system design. In the next contribution, authors present a model to estimate human factor quality in open source development. The final chapter focuses on the challenges of designing knowledge-management systems.
• **Usability Engineering:** This section of the book has three contributions. The first chapter provides a review of the methods for usability evaluation, and the next chapter focuses on personas and scenarios for functioning and health conditions. The final contribution of this section, which is the last chapter in the book, presents a study on the role of usability in e-learning systems.

**Brief Descriptions of the Chapters**

Chapter 1 is titled “Open Innovation: Assessing the Socio-Economic Factors of Global Software Development” and authored by Noel Carroll. It looks into the socio-economic factors of global software development. The contribution discusses the current modelling techniques and examines the SNA (Social Network Analysis) and I Star (*) modelling techniques, in particular.

Chapter 2 is titled “Innovations in Information and Communication Technology Platforms for Public Administration: Consulting the British Public in the Digital Age.” Authored by Shefali Virkar, this contribution presents an empirical study of an e-Petitions initiative in the UK and provides guidelines for developing citizen-centered e-government systems.

Chapter 3, titled “Software Engineering and New Emerging Technologies: The Involvement of Users for Development Applications for Tablets,” is authored by Sergio Mazini. It is about user involvement for software development for tablet devices. This contribution discusses the mobile technologies and presents a case study of using the digital catalog solution and sales force automation for tablets.

Chapter 4, developed by Shefali Virkar, titled “The Games People Play: The Politics of Software Platform Development and ICT Project Design for Public Sector Administration Reform,” presents a case study to unravel the social dynamics shaping e-government projects used to reform public-sector institutions. This contribution focuses on actor behavior, motivations, and interactions surrounding the conception and maintenance of software platforms facilitating these transformations.

Chapter 5, titled “Investigating the Success of OSS Software Projects” and authored by Amir Ghapanchi, presents a review of the existing literature to discuss and understand the success factors for developing open-source projects. A grouping of these factors in terms of project, product, and network classes is also discussed.

Chapter 6, developed by Laura Dahl and titled “Creating Effective Communication among User-Centered Technology Design,” focuses on user-centered design processes with respect to software development and presents a case for effective communication between and across design teams. The current literature is surveyed and conclusions presented.

Chapter 7, contributed by Jens Alfredson, titled “Managing Differences in Situational Awareness Due to Roles in the Design-Use Process of Complex Systems,” describes how Situational Awareness (SA) can differ between roles in the design-use process of complex software systems and explains how various roles in the design-use process can be more usefully employed in effective designs, focusing also on the management of related processes.

Chapter 8, developed by Barcelos et al. is titled “Improving Novice Programmers’ Skills through Playability and Pattern Discovery: A Descriptive Study of a Game Building Workshop.” It provides a descriptive study of a Game Design Workshop, aimed at introducing the fundamentals of structured programming to students, and illustrates how programming skills of novice software developers can be improved by dealing with playability issues and identifying relevant patterns.

Chapter 9, “Wiki for Agility,” by Pankaj Kamthan, proposes the use of Wikis for managing different type of content with respect to agile software development. It discusses the parity between agile
software development and Wikis, emphasizing human and social aspects in the Social Web-context of Wikis. Examples are also provided.

Chapter 10 is titled “A Semantic Approach for Multi-Agent System Design.” Authored by Girardi and Leite, it emphasizes the need for automating software development processes. In this contribution, authors employ MADAE-Pro, an ontology-driven process model for the design processes of two different case studies. Based on their evaluation, the authors show how software artifacts produced are later reused.

Chapter 11, “Model to Estimate the Human Factor Quality in FLOSS Development,” proposes a model for predicting human factor quality in open source projects. The authors consider level of project, aspects, and forms of evaluation as important parameters in their model. In order to quantitatively evaluate quality, 145 metrics are proposed as well.

Chapter 12 is contributed by Zaman et al. and titled “From Knowledge Management to Knowledge Governance: A System-Centred Methodology for Designing Indigenous Knowledge Management System.” This contribution highlights the difficulties in designing knowledge management systems in indigenous communities. On the basis of two longitudinal studies, the authors present a systematic framework to understand the requirements of indigenous knowledge management processes.

Chapter 13 is titled “Usability Evaluation Methods: A Systematic Review.” Discussing the concept and evaluation of usability evaluation, this chapter, authored by Martins et al., aims to analyze and classify the existing methodologies for the usability evaluation of products and services based on current ICTs. The contribution presents a review and results of a comparative study.

Chapter 14, titled “Personas and Scenarios Based on Functioning and Health Conditions,” by Queiros et al., looks into the personas and various scenarios based on functioning and health conditions to first discuss the concepts of Int. Classification of Functioning, Disability, and Health (ICF) and then presents a framework for the evaluation of Ambient Assisted Living (AAL) systems and services.

Chapter 15, titled “Role of Usability in E-Learning Systems: An Empirical Study of OWASP Web-Goat,” written by Amin and Saeed, focuses on e-learning systems, discussing the role of usability. The contribution presents an evaluation of a system based on OWASP to highlight usability problems and related issues. Important results are presented that are pivotal to the embedding of an operational as well as future user-friendly interfaces.

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