Preface

INTRODUCTION

With the ubiquitous nature of technological innovation over the last decades, not only have we seen the growth of new international and distributed research groups, but we are also witnessing the transformation of how scientific research itself is being developed in most traditional face-to-face universities and research centers. These technological innovations have driven the growth of new research opportunities, as researchers from different countries/regions can now interact with colleagues, who have similar research interests, at their convenience and without distance barriers. In effect, in a global world, researchers and research groups do not have to limit themselves to geographic or temporal regions and zones. On the contrary, they now have the opportunity to use Internet-based technologies to collaborate, without physical interaction, with other researchers and groups from different parts of the planet. As a matter of fact, Internet-based technologies and social networks are changing the way in which scientific research is developed worldwide. These technologies include, among others, online environments for collaborative research and work, materials in electronic format, specific subject-related software, groupware, and social network software, and Internet resources and services, e.g. cloud repositories, VoIP and videoconferencing tools, real-time translation services, etc.

Collaborative e-Research refers to the use of Internet-based computing, communication, and information technologies to develop international and distributed scientific research. Hence, it is our understanding that the term e-Research should refer to any kind of collaborative research activity throughout the Internet, in any academic discipline and field (not only Science and Engineering), and including also the design and development of Internet-based environments designed to facilitate this research. Additional issues, related to online collaboration, team management, inter- or multi-disciplinary approaches, research globalization, etc. must also be considered as directly linked to the e-Research domain. Benefits of collaborative e-Research are evident; just to name a few: researchers can interact and share knowledge with other remote researchers with similar interests without having to move from one country to another, international knowledge communities or social science networks can be easily and quickly configured, participation in foreign research projects is promoted, PhD and Master thesis can be co-advised by several senior researchers from different institutions, etc. Therefore, there is little doubt that the Internet is becoming a decisive tool in the international research arena, and, in fact, it is modeling the way scientific research is performed worldwide.

Among the different goals of this book, we can cite the following: (1) identifying and sharing worldwide best practices regarding Collaborative e-Research at an international level; (2) sharing theoretical or applied models and systems used in Collaborative e-Research, including the use of computer-supported collaborative research for international research projects; (3) forecasting emerging technologies

and tendencies regarding collaborative e-research and e-research management systems; (4) providing the academic community with a base text that could serve as a reference in research on collaborative e-research; and (5) presenting up-to-date research work on how the Internet is changing international research experiences and practices in a global and Web-based world.

CHAPTER SYNOPSIS

The chapters in this book have been divided into two parts: (1) Technologies and Strategies and (2) Applications and Case Studies. What follows is a chapter-by chapter overview for each of these areas.

Section 1: Technologies and Strategies

In Chapter 1, "*Investigating eResearch: Collaboration Practices and Future Challenges*," Markauskaite et al. explore open questions in e-Research such as: Why and how do researchers collaborate, share knowledge resources, data, and expertise? What kinds of infrastructures and services do they use, and what do they need for the future enhancement of collaborative research practices? etc. Their findings are based on collaboration practices developed at several universities.

In Chapter 2, "*The Web as a Platform for e-Research in the Social and Behavioral Sciences*," Garaizar et al. review the most recent Web paradigms (e.g. the Social Web, Semantic Web, and Cloud Computing), as well as their implications for e-Research in the Social and Behavioral Sciences. They also discuss the possibilities offered to social science researchers by the current and future Internet.

In Chapter 3, "*E-Research Methodology*," Khatibi and Montazer focus on electronic scientific databases and discuss their role in the research process. They also propose a comprehensive methodology for the e-Research process and elaborate on the importance of scientific Web services to the scientific community.

In Chapter 4, "*Collaborative and Distributed e-Research Environment for Supporting Scientific Research and the Education Process*," Nam et al. analyze the scientific research and education processes in the context of a Cyber-Environment for Collaborative and Distributed e-Research. As a real example, they also examine the workflow of e-AIRS, a problem-solving environment for aerospace research.

In Chapter 5, "*Connecting and Enabling the Humanities: e-Research in the Border Zone*," Paul Arthur discusses how e-Research is evolving in the humanities. He also analyzes different ways in which researchers in that field are utilizing Internet-based methods.

In Chapter 6, "*Data Sharing in CSCR: Towards In-Depth Long Term Collaboration*," Reffay et al. examine the importance of data in the research process and the potential benefit for communities to share research data. They propose their vision of data sharing in a world where scientists would use social network applications.

In Chapter 7, "*Artificial Intelligence Supported Non-Verbal Communication for Enriched Collaboration in Distributed E-Research Environments*," Smith and Redfern discern important concepts and current issues related to remote research teams. They also discuss current research in the use of automatic facial expression recognition systems in the context of collaborative and distributed research and work.

In Chapter 8, "*An Ontological Structure for Gathering and Sharing Knowledge among Scientists through Experiment Modeling*," Casillas and Daradoumis propose an ontology-based model to support scientific interaction among researchers involved in common problems.

Section 2: Applications and Case Studies

In Chapter 9, "*CAWriter: A Computer Supported Collaborative Tool to Support Doctoral Candidates Academic Writing – A Pedagogical and Human-Computer Interaction Perspective*," Byrne and Tangney present a collaborative tool to support PhD candidates with their academic writing and analyze a range of related topics, including pedagogical concerns, writing practices, existing tools, and human-computer interaction approaches.

In Chapter 10, "*Collaboration within Multinational Learning Communities: The Case of the Virtual Community Collaborative Space for Sciences Education European Project*," Kordaki et al. investigate essential features of a multinational virtual community that can promote effective collaboration and research. They describe the Socrates Comenius 2.1 European Project, participated by researchers from five European countries, and some of its main results.

In Chapter 11, "*E-Mentoring: Issues and Experiences in Starting e-Research Collaborations in Graduate Programs*," Faulin et al. review some recent works related to e-Mentoring and e-Research, discuss the benefits and challenges of e-Mentoring, and depict some personal experiences on the topic.

In Chapter 12, "*Addressing Conflicting Cognitive Models in Collaborative e-Research: A Case Study in Exploration Geophysics*," Paolo Diviacco describes a Web-based system that is currently used within several international collaborative research initiatives. The system is based on the integration of diagrams, where concepts and their relations are expressed at an optimal granularity, and shared spaces, where information can be made available to all partners.

In Chapter 13, "*Effects of the Drewlite CSCL Platform on Students' Learning Outcomes*," Noroozi et al. present a case study of Computer Supported Collaborative Learning at Wageningen University in the Netherlands. Moreover, they investigate the effect of the type of collaboration in Computer-Supported Collaborative Learning on students' learning outcomes.

In Chapter 14, "*Social Network Analysis Tools to Understand how Research Groups Interact: A Case Study*," Mayte Lopez applies Social Network Analysis to information retrieval from a multidisciplinary database and discusses how network graphs can be used to show working groups, overlap networks of co-authorship, and patterns of cited references.

In Chapter 15, "*Collaborative and Distributed Innovation and Research in Business Activity*," Allan et al. describe how Value Networks can be applied in multi-stakeholder business and research environments to characterize different approaches to collaboration.

Finally, in Chapter 16, "*E-Research Collaboration of International Scope in Social and Political Sciences: Scale and Complexity Linkage with the Requirement of Physical Encounters*," Mayo Fuster presents a comparative analysis of three case studies on global e-research collaboration. This chapter explores whether the requirement of physical meetings in e-research collaboration is independent of the scale and complexity of the collaboration established.

FINAL WORDS

There are a growing number of available books covering e-learning, computer-supported collaborative work, and, of course, a long history of books covering research issues. However, to the best of our knowledge, this is one of the first international books focused on Internet-based collaborative research, or, simply, collaborative e-research. Accordingly, we expect this book to be a valuable tool for academ-

ics and professionals involved in distributed and collaborative research, international research centers, collaborative software developers, as well as instructors implementing courses in computer-supported collaborative work. The text will also be potentially useful for senior year undergraduate or graduate studies in Information Technologies and related fields.

e-Research is an emerging, tech- and social-based, multi-disciplinary, and continuously evolving area of interest for researchers worldwide. With the currently available information, communication, and computing technologies, it is natural to expect that an important part of the next-decade research will be developed by multi-disciplinary and international teams, sharing and analyzing vast amounts of data, performing simulations over distributed computing systems, and using Web-based environments to communicate and collaborate online. If we also consider the rate at which the aforementioned technologies have been evolving during the last decade, and expecting a similar evolution for the following years, we can only say that the best is yet to come.

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