Preface

One of the current dilemmas in the context of the expansion of the social networks is keeping and increasing the quality of communication between the users and the new technological devices. That is, we are in front of a quantitative-qualitative relationship. In that equation, the society and/or producers of goods/services in the field of the new technologies include the time factor and the cost factor. Consequently, it is about offering goods and/or quality services with reduced costs in the least possible time, and in relation to the greatest number of potential users of the new technologies. Accordingly, those four words—quality, quantity, time, and cost—are cornerstones of the following pages.

An axis of actions that transits and underpins any analysis (in a context of great changes in the sciences) is the complex factors stemming from the change of century and millennium. Historically, a change of century has always meant for humanity great technological advances in daily life, especially since the ever-increasing momentum behind the global village of communications. These changes theoretically were supposed to be exponential and expansive to all the inhabitants of the planet. However, with the passing to the new millennium, a reduction of positive effects has been seen, due to myriad factors and variables. One of those factors is the digital divide. A great part of the members of the current societies do not have guaranteed a constant qualitative access to the digital world, and accordingly, with reduced costs to the multimedia mobile information, those daily advances, theoretically for the common good of humanity, have slowed down considerably. These are some of the negative financial variables present in the first decade of the new millennium, which in fact originated in tiny sectors of the summit of the population.

It is necessary to make clear that not only economic are those elements that generate that paralysis of growth and dissemination of scientific knowledge in the base of the population pyramid. For instance, there are the human factors in the educational field. These human factors, if unchecked, can completely disarticulate the notion of quality, not only in the presence of the current networks but also in terms of the immediate future, as well as in the long run. The negative influence of the power groups is easily detected in the analysis of the contents of the mainstream media, such as the online digital press, which can be simultaneous, whether it is in a reduced format (or similar), or alternatively to the publication of less-than-rigorous academic materials in analogical or paper support, for instance. These are publications with great national and international circulation. So much so that a Spanish language newspaper based in Madrid, Spain (El País – www.elpais.es), announced a change of the interactive design (10.01.2014), placing in the first page the scientific information.

A priori and inarguably, it is good news, but automatically, the day after the change, a false news item appears, according to which the foremost Spanish university appears in the ranking of the 200 best universities in the world (http://politica.elpais.com/politica/2014/10/01/actualidad/1412182471_480752.
Oddly enough, the university that is mentioned, which is based in Barcelona (Spain), founded in the 90s, has the greatest index of negative human factors, if the field of the new technologies is analyzed in detail, where expressions, such as bossing, mobbing, academic stalking, endogamy, among so many, are the common denominator in the daily actions of corruption and destruction of the local and global educational system. Actions which are repeated in each one of the centres with which they keep bidirectional relationships, can be the alleged collaboration agreements for research and student interchange between European universities and those of the rest of the world. That is, university educational centres, which are apparently public (the main source of financing stems from the taxes that the European citizens pay), nevertheless offer lifelong functionaries in the role of professors, chiefs of departments, faculty deans, faculty directors, etc., and all apparently, and by the aforementioned actions, are devoted to slowing down the advance of the sciences. All of that is due to the fact that their daily deeds escape, or blatantly depart, from the sciences of the various areas of knowledge and towards the wild educational mercantilism plus an immutable exercise in the control of the freedom of expression. Ever a bastion of humanism, freedom of expression, one of the most important benefits of social mass media from the point of view of the zones that are covered by its distribution, does have an element of democracy, but there are limits in terms of truth and academic forthrightness and just plain honesty.

Unfortunately, a mercantilism stalks and avails itself of all the tools of the current social networks. A key priority and initial goal is to increase its presence and power (democracy, but not in the wrong way), such as can be the control they exert in the sciences and education section of the Spanish newspaper previously mentioned. Evidently, that is a small example, but it is a modus operandi, which can be easily detected in the European south, where the human factors turn into social factors. The social factors are due to the fact that those people who have and exercise the unlimited power over computer science education, the systems and architecture of information, software engineering, multimedia engineering, telecommunication engineering, and a long etcetera are themselves inside the ICTs (Information and Communication Technologies). They are responsible for the deviations. Deviations where the future professionals of the sector, even if they have a brilliant academic/working record, with an excellent capacity, competence, and knowledge in the new technologies, end up unemployed or carrying out any task for daily survival in the, technologically speaking, developed societies.

The origin of the problem of the human and social factors that may well seriously damage the sciences of the future lies partially in the ways and methods by which academic titles have been obtained in the last decades of the 20th century. Focusing on the map of the European Mediterranean and considering the wild mercantilism of the education, it is feasible to observe that those who manage the harmful power have obtained their titles in a record time, in private or religious institutions, or with political institutions of a hybrid type, that is, universities financed by the citizens but ruled by small groups of great power and with international ramifications. It is they who often decide the timing in which the students will finish the studies of a doctorate, those who will get a job akin to what they have studied, those who will get a scholarship once finished and/or an opportunity to continue their studies abroad, those who will be favoured by a high and continuous attendance of the potential participants to certain congresses, symposiums, workshops, those who will decide the contents to be promoted in the social mass media, whether it is in analogical or digital support, those who will determine in the mid- and long-term the lines of research within and without the borders of a country, etc.

This is a short description of the chaos for the future of the sciences, where their mentors and promoters have obtained titles of the highest educational level thanks to their friends/colleagues and who today are giving back those favours to their relatives and friends, making up an endless spiral with the passing
of time. A simple way to verify it is the scientific publications, where the candidates to a doctorate do not even have a logical modicum of scientific publications, in an autonomous or individual way, in prestigious associations such as ACM (Association for Computing Machinery – www.acm.org) and IEEE (Institute of Electrical and Electronics Engineers – www.ieee.org), to mention a couple of examples. There are also the databases where the amount of yearly publications of some writers is such that not even a humanoid robot, gifted with the best artificial intelligence, can reach those fake numbers of authorships in the scientific publications. In few words, we have described a second coming together, or crossroads, of the current book: education, research and development, new technologies, and human/social factors.

Fortunately, somewhat larger, more free, and in front of the chaos in certain places, there is the cosmos of other places on the planet, with the constant advance of microcomputing, the quanta computers, the wireless telecommunications, the dynamic and static means of interactive communication, the interactive design in the social networks, etc. With a set of rhetoric questions, such as we suggest and exemplify here, not only can the reader draw the contents of the main and secondary topics of the current book, but the reader can also orient themselves towards the third and last group of four components that interrelate with each other. The main questions are: What are the trends of R&D in the short-, middle-, and long-term? Towards what new era is communicability heading? What aspects of the graphic software and hardware will draw more attention of the so-called digital native users? How can the hardware be optimized for the programs of the graphic software 2D/3D and vice versa? What is the role of graphic computing in the dissemination of the cultural and natural heritage? What kind of installations boost the interaction with the contents in real and/or virtual museums? What new techniques and/or methods are possible to measure the errors at the moment in which the user interacts with a multimedia system? What links are there between biocomputing and 3D graphics? What are the new horizons in the realism of the 3D applied to medicine? What is the future of super computers? Where is the research in high-performance computing heading? What is humanistic computing? What essential elements of online digital safety will have to be foreseen for the communications among the users, in view of the constant advance of the mobile multimedia devices? What are the new frontiers in e-commerce? Are there still limitations in the sale of online products/services? What are the advantages of the videogames to establish links among users of different ages and cultures? What elements of design have stayed in the hypertext, multimedia, and hypermedia systems with regard to video games? What is the role of the narration and playability in the video games of the new generations of users? Why is the diachronic analysis important in the evolution of interactive design? Where can we find good examples of information in the social networks? Why is the Web 2.0 turning into a kind of social antimodel? What are the main characteristics of the metaphors of the current interfaces aimed at the real spaces? What is a lookable user interface? Where are the 3D user interfaces evolving? How can the interaction with the mid-air projection screen technology be improved? What strategies can be used in the voice and multimedia applications to communicate from multi-access scenarios? How can a quality analysis of Voice over Internet Protocol in real time be made? What are the new educational models for the professionals of the mid-current century? What are the challenges for the designers of computer applications in ubiquitous learning? Why is data mining important in computer-supported collaborative learning? How is it possible to reach an effective collaborative learning in virtual worlds with the use of intelligent agents? Is the use of microblogging possible as an assisted-learning tool? What new frontiers of R&D are opening in the human-computer interaction, through the transformation of the social communication media and the social networks? What are the social signals in human-computer interaction? What new roles will the evaluators of communicability have in view of the evolution of the hardware? Will the auditing of quality in the interactive
systems become a new subject in the programs of teaching of engineering or computer science majoring? Resorting to the set of rhetoric questions, we generate our last set of four components: the users, the design, the human-computer interaction, and the software/hardware.

These questions denote a 360-degree vision of the content of the current work. In addition, many of them have been asked directly by their authors in the following conferences and/or symposium and/or workshops (2013 and/or 2014): ADNTIIC (Advances in New Technologies, Interactive Interfaces, and Communicability), SETECEC (Software and Emerging Technologies for Education, Culture, Entertainment, and Commerce), HIASCIT (Horizons for Information Architecture, Security, and Cloud Intelligent Technology), HCITISI (Human-Computer Interaction, Telecommunications, Informatics, and Scientific Information), CCGIDIS (Communicability, Computer Graphics, and Innovative Design for Interactive Systems), HCITOCH (Human-Computer Interaction, Tourism, and Cultural Heritage), and MSIVISM (Multimedia, Scientific Information, and Visualization for Information Systems and Metrics).

It is a 360-degree vision derived from the formal and factual sciences. Through the three axes, whose components are in a constant bidirectional relationship, the main and secondary topics are established, which are presented in a kind of inverted pyramid, that is, from greater to lesser extension of contents. That dynamism between the formal and factual sciences makes the current book a very novel proposal, since they try to solve the open questions, which have been generated through the use of rhetoric. In addition, in that 360-degree movement attention is given to certain fields of scientific knowledge, which are treated in detail and masterfully in each one of the research works submitted by the different authors. At the start of those works there is a brief state of the art, which describes the importance of the main/secondary topics that are approached, as well as the existing interconnections with the structure of technological knowledge, whether it is from a theoretical and/or practical perspective.

These interconnections make a constant reference to the three central axes of the book. In addition, in the works is verified a gradual development of the issues tackled at the start, until we reach the conclusions, whilst learned lessons and future lines of research for further elaboration and development. Consequently, it is a book which is unique, not only at the moment of understanding each one of the issues dealt with, but also as a source of consultation for the future, starting always from a careful look at artificial intelligence, audio-visual communication, computer animation, computer graphics, computer science, computer-aided design, cyber behaviour, data mining, electronic learning, ergonomics, global business, Internet, multimedia, open source software, quality attributes in the interactive systems, quality metrics, robotics, semiology, social psychology, sociology, software engineering, telecommunications, ubiquitous computing, usability engineering, virtual societies, wireless and mobile computer science, etc. Disciplines/skills of great topicality and impact are explored, since through them human beings can potentially generate avant-garde contents in realistic 3D, the last generation of interactive systems, to mention an example. An extensive listing connotes and reflects the requirement and also skill necessary to find interaction zones of the disciplines among the different domains, fields, and specialities, which at the same time potentially boosts and merges the formerly different scientific views. In short, the intersection of the formal and factual sciences has generated a 360-degree vision of the original content of the pages.

Contents which are organized in a pedagogical way, which is easy to understand, denoting that the current book is advisable for the following readers: students and computer sciences professors, systems, multimedia and graphic computing, consultants and analysts of online and offline interactive systems, interactive designers, programmers, analysts and application engineers for the social networks, ICT technicians, professionals of the social sciences, experts in the new technologies in the real and virtual communities, among others. It is also advisable for those readers in general who feel attracted by the
past, present, and future of the avant-garde technological revolution and its main derivations in daily life. Finally, the didactic character of the contents makes the book an interesting and reliable resource as a compendium of reference for the researchers.

The book is organized into 20 chapters and 2 appendices. We briefly present each one of the research works developed by their authors:

Chapter 1, “Phaneroscopy for Video Games,” is the title with which the authors of the research, Francisco V. Cipolla-Ficarra and Jacqueline Alma, present a first study for the classification of the video games from a synchronic and diachronic perspective, in relation to the notion of phaneroscopy. In the current research, a correct phaneroscopy is that which focuses on the contents of the videogames. It is also feasible to carry out semiotics analysis regarding these interactive systems as an intersection of dynamic and static means, and not as a union.

In Chapter 2, “Synechism in the Video Games Design,” the authors, Francisco V. Cipolla-Ficarra, Jacqueline Alma, and Alejandra Quiroga, present an analysis of the first set of elements belonging to the interactive design categories, layout (naturalness of metaphor) and content (storytelling), which make up synechism in the video games design, since the 1990s. In short, the possibility of establishing links with those elements of interactive design that do not change with the passing of time is positive for communicability.

In Chapter 3, “Lookable User Interfaces and 3D,” Alan Radley considers the computer not as a tool, or as a bicycle-for-the-mind, but simply as self. In this research, Radley has viewed computers as potentially beneficial to society, but as not necessarily so. We can also find the results of testing a new type of electronic mail named KeyMail.

In Chapter 4, “Time-Windows Reconnecting the Window-Metaphor of the GUI to Real Space,” Andreas Kratky presents a first interation of the Time-Windows set-up. He focuses on the observation of users and the behavioral patterns they displayed in the interaction with the screens. In other words, the study observes user behavior and interactions with a set of large-format touchscreens in order to assess users’ abilities to integrate their interpretations and operations with the displayed information across multiple, spatially distributed screens.

In Chapter 5, “Practical Metrics for Error Assessment with Interactive Museum Installations,” the authors, Andrea Albarelli, Luca Cosmo, and Filippo Bergamasco, present a metric and a practical setup that can be adopted to evaluate a wide range of viewer-dependent displays. The research describes a simple yet effective approach to build a view-dependent stereoscopic display and to evaluate its performance. In other words, they proposed to study separately the repeatability of the pose estimation (with the pose accuracy) and the compliance of the observed scene with the virtual one (with the reprojection accuracy).

In Chapter 6, “Improved Interaction for Mid-Air Projection Screen Technology,” the authors presents a Microsoft Kinect-based 2D and 3D tracking for mid-air projection screens. Kinect cannot track through the fog screen due to disturbances caused by fog. In addition to robust tracking and lower cost, the custom Kinect tracking also brings along other advantages such as possibilities for projector’s hotspot removal, ballistic tracking, multi-user, multi-touch and virtual reality setups, and novel user interfaces.

In Chapter 7, “Methodology for Transformation of Behavioural Cues into Social Signals in Human-Computer Interaction,” Tomaž Vodlan and Andrej Košir analyze a methodology for transformation of behavioural cues into Social Signals (SSs) in human-computer interaction. The present methodology consists of three main steps: behavioural cues acquisition, manual and algorithmic pre-selection of behaviour cues, and classifier selection.
The author of Chapter 8, “Methods of Skull Implants Modeling with Use of CAx and Haptic Systems,” is Marek Wyleżoł. He presents four exemplary and original methods of virtual skull implant modeling. In this bioengineering research, the time of the virtual model developed is very short compared to use of only one of standard engineering CAx systems, for instance. Wyleżoł predicts that more and more often these implants (also the all skeletal system) will be performed with the use of generative technologies.

In Chapter 9, “Efficient Prefix Scan for the GPU-Based Implementation of Random Forest,” the author, Bojan Novak, discusses the random forest ensemble learning with the GPU version of prefix scan method. The content of the text starts with a study of the state of the art and the motivations of the current chapter.

In Chapter 10, “The Future of Supercomputers and High-Performance Computing,” the author, Domen Verber, describes a complete state-of-the-art and a possible future of HPC (High Performance Computing). The main focus of the research work is on different hardware architectures for High-Performance Computing and some particularities of HPC programming. In addition, some alternatives to traditional computational models are given.

In Chapter 11, “Lookable User Interfaces and 3D,” the author, Alan Radley, illustrates a new philosophy of user interface design, the “Lookable User Interface” (LUI). The approach is based on the concept of a Personal Reality (PR) system. In addition, the author presents Spectasia as one example of a Personal Virtual Reality (PVR) that can be used to visualize links between universals and particulars within digital worlds.

In Chapter 12, “Microblogging as an Assisted Learning Tool in Problem-Based Learning (PBL) in Bahrain: The Edmodo Case,” the authors, Vasileios Paliktzoglou and Jarkko Suhonen, study the use of social media tools in higher education. In particular, they investigate the students’ level of familiarity, engagement, and frequency of use of social media technologies. In addition, the authors analyze the experiences of using the Edmodo tool to support PBL.

Elena B. Durán and Margarita Álvarez are the authors of Chapter 13, “Ubiquitous Learning Supporting Systems: A Challenge for Computing Software Designers.” In this chapter, ubiquitous learning is introduced and characterized, the challenges that must be faced by those in charge of designing and developing such applications are reviewed, and the state of the art of this recently initiated line of research at the informatics and information systems is shown.

In Chapter 14, “Data Mining Applications in Computer-Supported Collaborative Learning (CSCL),” the author, Rosanna Costaguta, discusses those data-mining applications that assist in the learning process. The work describes the phases and tasks involved in the entire process of knowledge discovery, and also presents some research applying data mining to process the contributions of students and teachers in collaborative-learning environments.

In Chapter 15, “Model for Effective Collaborative Learning in Virtual Worlds with Intelligent Agents,” the authors, Max Ugaz and Augusto Bernuy Alva, explore information about virtual worlds, collaborative knowledge management, intelligent agents, etc. The main goal of this research is to demonstrate the relation between the collaborative logic based on software agents and one virtual words platform in order to build effective results.

In Chapter 16, “Quality Analysis of VoIP in Real-Time Interactive Systems over Lossy Networks,” the authors, Maha Ziad Yousef Mouasher and Ala’ Khalifeh, developed a VoIP voice conferencing test-bed based on the Adobe Flash Media server that utilizes the real-time media flow protocol and the speex multi-rate voice codec. The implications of the developed work allows us to point out new roads for future investigations in the context of Quality Analysis of VoIP.
In Chapter 17, “An Integrative Method for the Evaluation of Network Attack Effectiveness Based on Grey System Theory,” the authors, Pengfei Wang, Wentao Zhao, Fan Zhang, and Zimei Peng, present an integrative method for the effectiveness evaluation of network attacks. The new method provides a solution to the problem of accuracy drop seen in prevailing grey evaluation methods when the clustering coefficients exhibit no significant difference.

In Chapter 18, “Vision of Best Practices for IMS Implementation,” the authors, Daniel Biga, Horacio Del Giorgio, Fernando Dufour, and Ariel Serra, discuss different perspectives around a framework architecture for delivering IP multimedia services, which allows voice and multimedia applications to communicate from multi-access scenarios (i.e., wireless), thus allowing the convergence of fixed and mobile networks.

In Chapter 19, “The Role of Electronic Commerce in the Global Business Environments,” Kijpokin Kasemsap presents the role of electronic commerce in the global business/marketing environments, thus explaining the main strategy, the applications, and the barriers to e-commerce adoption, etc. This kind of information could then be used, as the author claims, to find some “orientations” for global business.

In Chapter 20, “E-Commerce for Italian Textile Manufacturers: Limitations and Human Factors,” the author, Francisco V. Cipolla-Ficarra, makes a description of a set of topics which have been interrelated for a long time but which have acquired a special attention in the context of computer science, computer graphics, computer animation, textile managing, and productive computing, and the human factors that prevent boosting online sales.

In Appendix 1, “Social or Anti-Social Networking?” the authors present some negative examples of the adverse use of the social networking and/or Internet. The examples are 100% true and stem from digital newspapers, entrepreneurial websites, personal messages, etc. The authors make a wide-ranging reflection about the learned lessons signaling the negative aspects of the used technology.

Appendix 2, “A Set of the Good Online Information,” releases the results of an analysis applying communicability into Social Web. In addition, it opens new horizons in the next years, thanks to the advance of the hardware, software, and the researches into the present bibliography, for instance. Along with this, the authors introduce technological aspects of interactive design. The examples, which go with the text, illustrate the correct explanation of the developed introduction.

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