Preface

If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundations under them.

Henry David Thoreau (1817-1862)

In the word communicability we find implicitly the notion of quality. However, in the current book we use the word quality to boost the idea of seeking it in the implicit and explicit process of communication in the interactive multimedia/hypermedia systems. Here we understand as communicative process the continuous feedback between the user and the contents in the dynamic and static means of the hypermedia system. In this qualitative feedback the user comes into direct contact with the design aspects of the interactive system, such as the cognitive model used by the designer or his team.

In our case, we consider the design of these hypermedial on-line and off-line systems made up by several categories bi-directionally interrelated among them, such as presentation, navigation, structure, connectability and panchronism and content. In the presentation, all the variables related to metaphor, the graphical aspects of the interface (colors, typography, photographs, maps, etc.), the topographical disposition of each one of the static and dynamic means, etc come into play. Navigation represents the set of possibilities that the user has in each moment in the interaction of knowing where he is, where he comes from and where she/he can go, the different ways of activating and disactivating the dynamic means, etc. The structure is the architecture that makes up the nodes and links in the system, the modalities of access to the hyperbase data, that is to say, index or menu, direct search, etc. It is understood as panchronism the synchronization among the different dynamic means of an interactive system, for instance, the audio with animations, the audio with video subtitles, the face movements of the virtual characters or synthesis with the voice, etc. The content is mainly aimed at the study of the text organization and exceptionally the static images, as in the first hypertextual systems, for instance. All these categories and their different components make up our notion of design of an interactive system.

As it can be seen, it is an area which belongs to software and computer science engineering, human computer interaction and usability engineering. However, in contrast to what was partially established during the last two decades, in the design of interactive systems by the three enunciated engineerings, here we consider essential the communication variable from the perspective of social sciences. That is to say, communicability exists in the interaction between formal sciences and factual sciences enunciated by Mario Bunge\(^1\). This communicative perspective is essential even to avoid the butterfly system of redundance, vagueness, ambiguity and lack of originality in numerous research works as can be seen in the following graphics:
The problem in this mistake that is currently being caused in the lack of an analysis methodology of the real requirements of the users through the usability heuristic techniques is due to the difference of university study programs among the different continents. For instance, in software engineering, with the purpose of improving the quality of the products and services, the incorporation of psychologists, anthropologists, sociologists in the analysis team was promoted. This happened at the dawn of the nineties, that is to say, it coincided in time with the principles of usability engineering as stated by Jakob Nielsen². Those were years in which the personal computers compatible with IBM and with Windows operating systems had erupted in daily life. The momentum of the phenomena put to rest in many cases the traditional typewriter, thanks to the first word processors, such as the Wordstart or WordPerfect.

This phenomenon, joined to the first bases of commercial data of easy programming such as dBase, the calculation sheets with graphics, was due to generate a fast change in the attitude of users towards computers because they would not only have them in their daily working activity, but also in the home. Besides, it was a period in which the first video games through the computer made their appearance in the family context. That is to say, a time where usability had its great protagonism, especially because of the yearning to learn to use the operating systems, educative applications, pastimes, etc., by millions of users in the whole world. Simultaneously, the aegis of the personal computer (hardware and software more efficient and at a lower cost), the evolution of the interactive systems took place, going from hypertext to interactive multimedia until reaching the off-line hypermedia systems, with its star being in the mid-nineties in Europe the CD-ROM support, to then be replaced by the current DVD, before the end of the millennium. Also in the mid-nineties the use of the Internet was democratized and the first
hypermedia systems started to be on-line. In all this evolution those software, hardware, telecommunications professionals, etc. played an active role, whereas the professionals required for the quality of the software coming from the social sciences were left behind in second place.

Now in the history of sciences, the social sciences have always had fewer financial resources for research in those university studies centers where they coexist with formal and with factual sciences. This is one of the reasons why communicability has not been considered in the design of interactive systems and even in the recent maps that have been made of the different areas that make up the User-Centered Design\(^3\). The problem lies in many cases in the management of those funds, that is, a technician or an engineer is preferred to a holder of a bachelor degree in social sciences. This reality is the common denominator in many Latin cultures. In contrast, in the English speaking environment, the motives respond to the structuring of university careers. For instance, the studies about informatics, telecommunications, systems, etc., lacked subjects related to the social training of the future professional, that is to say, sociology, social psychology, cultural systems, etc. A great exception to this rule in the American continent is to be found in the old syllabuses of several public universities in the South and Central America. A way to make up for this shortcoming in the training of the future computer professional in Europe, has been to take short-duration masters courses. Here it is necessary to make a distinction between official masters in the public institutions of the state from those that pursue a purely market-oriented purpose taken in private universities and subsidized by regional governments. The latter usually even have an external appearance and a plan of study (the names of the subjects, for instance) similar to those of the public or state university institutions, but the degree of the requirements to the student body is practically null. Consequently, both the European computer experts and their American counterparts lack theoretical knowledge or experiences in social sciences. This lack has seriously damaged the speed of the evolution of high quality interactive systems.

The methods and techniques presented for the assessment of the quality of the software in general and belonging to the field of heuristics, stem from the social sciences and the statistics that were applied to the studies made in the social or mass communication media. With regard to the terms social or massive, the former have a lesser power of persuasion and manipulation of communication as compared to the latter, although the receptor of the message is the general public or what we would nowadays call on the Internet, a virtual community or social network. Another difference between both notions lies in the final purpose such as for example the common welfare of all, in the social media, in contrast to the business-like nature of the mass media. That is to say, the receptors of the multimedia contents may have a bigger or lesser critical ability or reflexive, at the moment of making decisions. In both cases, the techniques used by statistics to gather information from the public at large, such as interviews, direct and indirect observations, lab trials, etc., have always taken this great differentiation into account. With the first commercial hypertextual systems and in off-line support usability engineering was born in the 1990s. From mathematics and computer science began a convergence towards social sciences with the purpose of finding the final quality of the commercial products and aimed at the users of the whole world.

However, this convergence was aimed at the acceptability of the systems. In regard to this, Jakob Nielsen established the difference between social acceptability and practical acceptability. In the latter, he cited several components such as compatibility of the system, reliability, cost, usefulness, etc. In Nielsen’s concept of usefulness is the origin of the usability notion with its five principles: easy to learn, efficient to use, few errors, easy to remember and subjectively pleasing\(^4\). However, the communicative factor that lies implicit in any interaction process in the old and new means of social communication is not taken into account. The current compendium is somehow intended to fill this gap. The main goal is
to increase the quality of communicability in interactive systems and to introduce a new professional in the context of the information science, technology and management called an “heuristic assessor of qualitative communicability in interactive systems”. The secondary targets are to present a series of works in which it is possible to analyze the current state of the new technologies in several American and European universities and to create an area of excellence among the formal and factual sciences aimed at constantly increasing the quality of interactive systems, especially those related to multimedia/hypermedia on-line and off-line. We briefly present each one of the works developed by their authors.

In the first chapter, “Communicability in Educational Simulation”, its author Emma Nicol presents two examples of the first generation of dedicated educational simulation engines, that is, software dedicated to the building and running of educational simulations. The work begins with a discussion of the history of simulation in learning with a focus on professional learning, and goes on to discuss the virtual environments of SIMPLE and Cyberdam and their genesis in the virtual town of Ardcalloch. A discussion is made of evaluation outcomes from both of these projects, the implications for professional learning in higher education and a discussion is made of possible future directions for simulation environments of this type. Definitions of the various types of simulation are offered and simulation’s place within the wider context of e-learning and gaming is outlined. Taking her lead from earlier work by Cipolla-Ficarra, the author proposes some additional communicability measures for simulation environments.

In “Venture to the Interior: Virtual Object Lessons” the authors, Andreas Kratky and Juri Hwang, present an extension of the project One Laptop Per Child (OLPC), which puts computers for the learning process within the reach of all students. In it are described a series of strategies followed in the work ‘Venture to the Interior’ using digital content belonging to the Museum of Natural History in Berlin, Germany. The project has demonstrated the interesting possibility of educating using tangible and historical objects of the mixed reality environment. This end has been achieved using a combination of bidirectional and three-dimensional graphic informatics techniques. Aside from the use of the key features of digital photography, the objects are presented in their context with a high visual quality which facilitates human-computer interaction.

In the research presented by A. Bellucci, A. Malizia, P. Díaz, I. Aedo, with the title “The Anatomy of Web 2.0: The Web as a Platform to Promote Users’ Participation and Collaboration” its authors carry out a diachronic analysis of the different versions of the Internet, that is to say, past, present and future of the net. A meticulous historic description stresses each one of the main characteristics and components that the current net offers to the user. In its pages there are each of the services of the new generation aimed at the Web 2.0 and Web 3.0 virtual community. This text is a detailed summing-up of the technological evolution of the Internet, in very multifarious sectors which range from entertainment to on-line training.

Maria Claudia Buzzi, Marina Buzzi and Barbara Leporini are authors of the work titled “Accessibility and Usability of Web Content and Applications” where are presented the main aspects related to the access to the contents and the use of interactive systems for users without physical hindrances or those who have some kind of disability. Besides, they make a complete description accompanied by several examples of the advantages of usability and accessibility of on-line information. A case study –web interaction of totally blind persons serves to show us the main aspects of their research work, especially from the point of view of the simplification of the user computer interaction, such as their general guidelines for simplifying interaction via use of a screen reader and the increase of quality in the interaction of all the kinds of potential users, with the on-line multimedia systems mainly.
In the chapter named “A Diacritical Study in Web Design: Communicability Versus Statistical Manipulation,” the authors present a heuristic study of credibility destruction on-line through the statistics and the persuaders and manipulators of the information in the virtual communities, named as “star enunciators”. The analysis of the communicability for education, industrial information and general news, carried out in the contents of the websites of Southern Europe, particularly between Italy and Spain. A series of examples in the evolution of the web make it plain how the transparency of information disappears in those environments where the parochialism defined by Saussure prevails. Besides, basic and frequent statistics notions are presented to be used by the communicability evaluators.

In the work titled “How to Develop Intelligent Agents in an Easy Way with FAIA,” the authors, Jorge Roa, Milton Pividori, Ma. De los Milagros Gutiérrez and Georgina Stegmayer present the importance of the relationship between artificial intelligence and games in the university educational environment, in the context of engineering. In it is made a comparison of FAIA (Framework for Intelligent AI Agents) with existing approaches. After that, the framework architecture is shown in detail, its components and the concepts involved in its design. We also find some examples of FAIA instantiation with an agent that solves a search problem and an agent that uses situation calculus to decide its movements are explained and exemplified with real problems in detail. Finally, the main advantages of the FAIA framework are cited.

In the chapter “E-Governance Survey on Municipalities Web Sites” the authors, Rocío Andrea Rodríguez, Daniel Alberto Giulianielli, Pablo Martín Vera, Artemisa Trigueros and Isabel Beatriz Marko, analyze the main advantages of distance government through the use of the new technologies to speed up the citizen’s negotiations in front of the public institutions, for instance. Their work is aimed basically at usability, tending to improve the quality of the design of the on-line information in regard to government management in city councils. In this regard a series has been made of detailed heuristic assessments of 30 Argentinian websites, whose results and conclusions are presented in a detailed way in an Annex 2 (see annex section).

André Koscianski, author of “Changing the Rules: Injecting Content into Computer Games,” starts with a brief state of the art and the historic evolution where the importance of the video games in education is made clear. Under an interdisciplinary perspective it presents in detail the different stages of design, the importance of the communicative process among programmers, professors and artists for the generation of the video games with educational purposes. A set of examples are presented along its pages. Also are made clear the main advantages of introducing the video games in the classroom.

In “An Integrated Process for Aspect Mining and Refactoring,” its authors Esteban S. Abait, Santiago A. Vidal, Claudia A. Marcos, Sandra I. Casas and Albert A. Osiris Sofia present essential aspects inside object-oriented programming by using implicit criteria of the communicability inside software engineering. They propose a systematic process for the migration of object-oriented systems to aspect-oriented ones. The migration is achieved in two main steps; crosscutting concern identification (aspect mining) and code transformation (aspect refactoring) A detailed description of the process allows having an overall view of the problems to be faced and the developed solution. Besides, the results of JHotDraw, to Java object-oriented framework. (JHotdraw is a framework for drawing structured 2D graphics).

With a detailed explanation of the concepts behind the interactive media art piece The Imaginary 20th Century, Andreas Kratky, author of the chapter “The Imaginary 20th Century: Reconstructing Imagination”, examines the possibilities of interactive media to convey the an understanding for the mental climate of the historic period of the turn of the 19th to the 20th century. He explains how the piece uses a large database of period documents the piece reconstructs the imaginative processes how people
imagined their future extrapolating from the information available. After a methodological discussion of imagination and the processes involved the chapter outlines the concepts of the art piece, the selection of materials and the aesthetic decisions that were made for the piece.

In the chapter “Communicability Era: New Professionals for Interactive Systems” its authors, present the profile of a new professional in the context of design and communicability. This professional possesses a set of skills and/or experiences deriving from several sectors of the formal and factual sciences. The work begins with a brief description of the state of the art in education and the new technologies, stressing the intersection between both. Then are presented each one of the areas of knowledge of the new professional and the main reasons why the epistemological principles of the sciences should be followed, ruling out the mercantilistic factor in the public or state educative institutions. Simultaneously, a constant study of the terminology used in the design is made, the communicability, software and system engineering, usability engineering and human-computer interaction.

In the Annex 1 are the main notions of descriptive statistics. Besides, there is a series of examples in regard to the loss of credibility of the information in the interactive systems on-line, deriving mainly from the education and the entrepreneurial sector and the mass media (the surnames have been eliminated or modified to keep the anonymity of the ‘star enunciators’ and their collaborators). In the second annex are the detailed results of the research work made in Chapter 7 “E-Governance Survey on Municipalities Web Sites”.

Finally, in the section of additional bibliography, the reader who is interested may find books, magazines links to websites, etc. to go deeper into each one of the subjects that the several authors have presented along these pages.

ENDNOTES

2 http://www.useit.com/