Lorenzo Cantoni and James A. Danowski (Eds.)
Communication and Technology

Handbooks of
Communication Science

Edited by
Peter J. Schulz and Paul Cobley
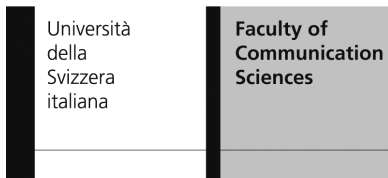
Volume 5

Communication and Technology

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**Faculty of
Communication
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Preface to *Handbooks of Communication Science* series

This volume is part of the series *Handbooks of Communication Science*, published from 2012 onwards by de Gruyter Mouton. When our generation of scholars was in their undergraduate years, and one happened to be studying communication, a series like this one was hard to imagine. There was, in fact, such a dearth of basic and reference literature that trying to make one's way in communication studies as our generation did would be unimaginable to today's undergraduates in the field. In truth, there was simply nothing much to turn to when you needed to cast a first glance at the key objects in the field of communication. The situation in the United States was slightly different; nevertheless, it is only within the last generation that the basic literature has really proliferated there.

What one did when looking for an overview or just a quick reference was to turn to social science books in general, or to the handbooks or textbooks from the neighbouring disciplines such as psychology, sociology, political science, linguistics, and probably other fields. That situation has changed dramatically. There are more textbooks available on some subjects than even the most industrious undergraduate can read. The representative key multi-volume *International Encyclopedia of Communication* has now been available for some years. Overviews of subfields of communication exist in abundance. There is no longer a dearth for the curious undergraduate, who might nevertheless overlook the abundance of printed material and Google whatever he or she wants to know, to find a suitable Wikipedia entry within seconds.

'Overview literature' in an academic discipline serves to draw a balance. There has been a demand and a necessity to draw that balance in the field of communication and it is an indicator of the maturing of the discipline. Our project of a multi-volume series of *Handbooks of Communication Science* is a part of this coming-of-age movement of the field. It is certainly one of the largest endeavours of its kind within communication sciences, with almost two dozen volumes already planned. But it is also unique in its combination of several things.

The series is a major publishing venture which aims to offer a portrait of the current state of the art in the study of communication. But it seeks to do more than just assemble our knowledge of communication structures and processes; it seeks to *integrate* this knowledge. It does so by offering comprehensive articles in all the volumes instead of small entries in the style of an encyclopedia. An extensive index in each *Handbook* in the series, serves the encyclopedic task of find relevant specific pieces of information. There are already several handbooks in sub-disciplines of communication sciences such as political communication, methodology, organisational communication – but none so far has tried to comprehensively cover the discipline as a whole.

For all that it is maturing, communication as a discipline is still young and one of its benefits is that it derives its theories and methods from a great variety of work in other, and often older, disciplines. One consequence of this is that there is a variety of approaches and traditions in the field. For the *Handbooks* in this series, this has created two necessities: commitment to a pluralism of approaches, and a commitment to honour the scholarly traditions of current work and its intellectual roots in the knowledge in earlier times.

There is really no single object of communication sciences. However, if one were to posit one possible object it might be the human communicative act – often conceived as "someone communicates something to someone else." This is the departure point for much study of communication and, in consonance with such study, it is also the departure point for this series of *Handbooks*. As such, the series does not attempt to adopt the untenable position of understanding communication sciences as the study of everything that can be conceived as communicating. Rather, while acknowledging that the study of communication must be multifaceted or fragmented, it also recognizes two very general approaches to communication which can be distinguished as: a) the semiotic or linguistic approach associated particularly with the humanities and developed especially where the Romance languages have been dominant and b) a quantitative approach associated with the hard and the social sciences and developed, especially, within an Anglo-German tradition. Although the relationship between these two approaches and between theory and research has not always been straightforward, the series does not privilege one above the other. In being committed to a plurality of approaches it assumes that different camps have something to tell each other. In this way, the *Handbooks* aspire to be relevant for all approaches to communication. The specific designation "communication science" for the *Handbooks* should be taken to indicate this commitment to plurality; like "the study of communication", it merely designates the disciplined, methodologically informed, institutionalized study of (human) communication.

On an operational level, the serieiis aims at meeting the needs of undergraduates, postgraduates, academics and researchers across the area of communication studies. Integrating knowledge of communication structures and processes, it is dedicated to cultural and epistemological diversity, covering work originating from around the globe and applying very different scholarly approaches. To this end, the series is divided into 6 sections: "Theories and Models of Communication", "Messages, Codes and Channels", "Mode of Address, Communicative Situations and Contexts", "Methodologies", "Application areas" and "Futures". As readers will see, the first four sections are fixed; yet it is in the nature of our field that the "Application areas" will expand. It is inevitable that the futures for the field promise to be intriguing with their proximity to the key concerns of human existence on this planet (and even beyond), with the continuing prospect in communication sciences that that future is increasingly susceptible of prediction.

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Introduction

Lorenzo Cantoni and James A. Danowski
Communication technologies: An itinerary

Abstract: This introductory chapter provides an overview on the entire volume. In particular, it explains the very structure of the book, organized in three sections: (I) "Mediavolution": communication media between evolution and revolution; (II) Communication technologies and their environment; and (III) Communication technologies and new practices of communication in the information and communication society.

Every chapter is then briefly outlined, so to better understand the overall architecture and the richness of the collected papers. A paragraph especially devoted to diffusion models and communication technologies, and some textual analyses do complement the introduction.

When Peter J. Schulz and Paul Cobley invited us to be part of this extraordinary enterprise of the *Handbooks of Communication Science*, that seemed to us a challenge you cannot refuse, and at the same time an (almost) impossible mission.

On the one hand, we are fully convinced that one of our goals – one might even say missions – as academics is not only to move further and further research in specific areas, but also to try to make sense of all new advances, so to integrate them in a meaningful – even if always incomplete – picture. As per the famous suggestion by Aristotle, understanding is always a unifying process, which finds commonalities, analogies, rules, even theories under endless changes of our experience. And this is, in fact, what is suggested by the name itself of University: finding centers, polarities, which explain, and cast light onto countless individual elements. Which attract, order, and explain our changing experiences.

On the other hand, we must acknowledge that, while the research enterprise is always challenging and a work-in-progress, the topic itself of this volume makes it even more challenging: in the end it is not without reason that Communication Technologies are also referred to as *New Media*: to emphasize their ever-changing nature, their fast running towards new communication technologies, practices, configurations ... The topic itself is clearly discouraging any attempt to provide any established (enough) knowledge: any encyclopedic overview appears condemned from the very beginning to fail both because it won't be able to reach a too fast-moving target, and because won't be able to reach enough depth while presenting (b)leading innovations, processes started just a few years ago, and far from being clearly understood.

Nonetheless, we accepted. First, because we knew that we could share such challenge – and eventually succeed – with the help and patient collaboration of so many good colleagues and friends; second, because communication processes (and technologies) are always rooted in basic human needs, which might find unforeseen embodiments, but can't escape a thorough analysis, able to go beyond what appears at first sight; third, because this is anyway our mission as academic researchers: now more than ever students and young researchers need to be provided with good maps and compasses to navigate in the very perilous sea of Information and Communication Technologies (ICTs). And maybe (fourth) because we are not only hungry of knowledge, but also fools …

This introductory chapter is organized as follows: it provides first a paragraph on Changing Diffusion Models and Communication Technologies, followed by an helicopter view on the volume and on its structure, and then by a detailed presentation of the various contributions. A very last paragraph acknowledges the many people who have made this mission possible (if successful, will be judged by the readers).

1 Changing diffusion models and communication technologies

As mentioned above, new media – which in turn are going to become old and to be substituted by newer ones – are anyway distributed on a timeline, which runs in parallel with the very history of human beings: our need to communicate between and among us, to share one of our richest treasures: what we think (love or fear, like or dislike …), a richness that requires the full communication toolbox human beings have received and developed across centuries and continents. A good/responsibility, which in Latin was said "munus", and where the very term "communication" is rooted, to suggest such sharing of meanings.

While several attempts have been made to uncover the development from pure orality to various communication media or "technologies of the word" (see for instance Ong, 1982), and their *mediamorphosis* (Fidler, 1997), new media are presenting a somehow accelerated adoption/diffusion pattern, if compared with previous technological innovations. Such peculiarity has to be briefly introduced here, so to stress one more time not only the challenge of editing such a book, but the new context brought about by (currently) new media.

In the early 1970s, the modern convergence of communication technologies began. The two initial technologies were known as 'telecommunications' (mainly telephony systems) and 'computers.' Oettinger (1971), a professor of Information Resources Policy at Harvard, and frequent participant in congressional hearings about new communication technologies in the U. S., coined a new term to describe

this convergence of computers and telecommunications: "Compunications." This heralded a new age of communication and technology that required changes in public policy regarding what would later become better known as the "Information Society" (Porat, 1977).

Prior to this time, particularly before the mid-1960s, diffusion of communication media, and other innovations – concepts, products, and processes – followed an S-shaped diffusion curve (Rogers and Shoemaker, 1971). This cumulative normal distribution over time was because of the primary importance to adoption of interpersonal communication networks. Because of the constraints on how many individuals a person could maintain close relationships with, talking with others to persuade them adopt was quite limited. Media were not significant in these classic diffusion processes. Rather, the process was one of contagion, with information moving virally from one person to another.

At the same time, industrial societies had been producing age-graded cohorts (e.g. generations) primarily based on being born near the same time and experiencing the same historical contexts and events. When peak industrialization occurred in the mid-1960s in countries such as the U.S., age-grading as the basis for cohort formation began to change. Evidence shows that after 1966 "post-industrial societies" (Bell, 1967), in which manufacturing comprised less than 50% of GDP, cohort formation also changed. Rather than based on birth, cohort formation was increasingly based on shared interest in common communication media content (Danowski & Ruchinskas, 1985).

This dynamic of developing communication cohorts impacted as well on the diffusion process for new communication and technology innovations. Adoption became increasingly based on messages people obtained from media and less from direct interpersonal network communication. The previously dominant S-shaped diffusion curve, a cumulative normal distribution of adoption over time, became increasingly supplanted by the convex-shaped diffusion curve, which Bass (1969) called the R-curve. Figure 1 shows the differences in shape of these two diffusion curves. As the bulge of the curve becomes more convex, media messages are having more influence on adoption than are interpersonal communication networks.

As these fundamental changes in processes of diffusion occurred, the adoption of new communication technologies increasingly followed r-shaped rather than s-shaped diffusion curves. New theories were needed to explain these processes (Danowski, Riopelle, and Gluesing, 2011). R-shaped diffusion has been explained as "herd effects" (Choi, 1997), taken from animal behavior. Once lead herd members begin to move in a particular direction, the other members quickly follow suit with no knowledge of environmental conditions. This results in an adoption curve with very rapid growth over time followed by a tapering off as laggards adopt.

In communication terms, these increasingly convex r-shaped diffusion curves are largely the result of changes in communication and technology. Rosenkopf and Abramson (1999) refer to these r-curves as "information cascades," theorizing that their occurrence becomes more likely as there are: 1) a greater number of mediated
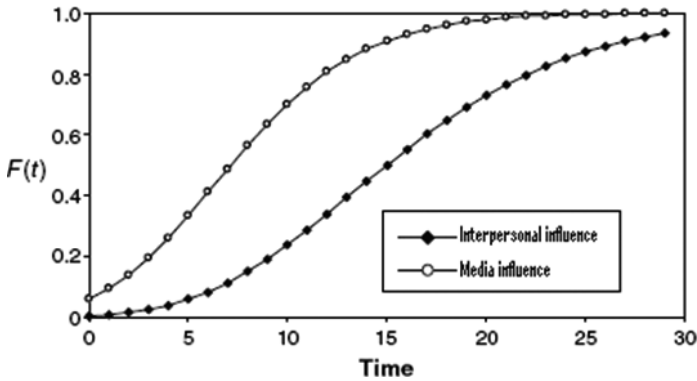
Fig. 1: Convex media influenced adoption curve compared to interpersonal influence S-shaped curve.

messages about the innovation, 2) more ambiguity about its efficiency/effectiveness, 3) more mediated messages about the number of adopters, and 4) more mediated messages about the social status of adopters.

We would add that the smaller the time interval of the communication media news cycle, the greater the likelihood of information cascade processes. These intervals have shrunk from daily, during the broadcast media dominance of the industrial era, to a virtually real-time cycle with a time interval of seconds in contemporary post-industrial information societies.

As well, there are the effects of the post-industrial communication cohorts based on shared information interests and media channels, rather than on age. Communication cohort members identify with their cohort and make inferences that their own interests in communication content are shared by other members without having to talk with them about this. When they see in social media evidence of other communication cohort members adopting an innovation, they are more likely to adopt without exchanging messages with others. Communication technology diffusion, as well as diffusion of concepts, products, and processes through these new media, is increasingly likely to show bulging convex diffusion curves rather than the s-shaped curves of the industrial era.

2 An helicopter view

The volume presents thirty chapters, organized into three sections: *"Mediavolution": communication media between evolution and revolution*; *Communication technologies and their environment*; and *Communication technologies and new practices of communication in the information and communication society*. The first two sections feature nine chapters each, while the third one features twelve chapters. In

Tab. 1: The 50 most common words present in the book.

Item	#	Item	#
new	1'057	computer	281
communication	1'038	http	272
information	1'035	design	271
social	1'017	public	270
technology	1'006	www	259
media	797	recording	251
internet	726	systems	247
research	655	user	247
digital	610	health	246
virtual	526	members	229
online	514	networks	228
community	493	users	225
world	477	experience	223
web	455	international	223
mobile	434	society	222
development	398	news	221
data	392	reality	214
network	361	access	212
learning	324	university	211
press	318	work	211
human	303	studies	210
people	299	theory	209
journal	298	music	205
example	292	content	202
time	288	government	201

general, while the first two sections include longer contributions, the last one presents shorter papers.

The first section approaches the topic moving from semiotic codes and technologies themselves, and explores their changes and innovations in recent time, as well as models to interpret them. It deals with newspapers wires services, telecommunication networks, cinema, music, video-games, hypermedia and the web, virtual reality, social networks, up to so-called web2.0 and 3.0 ...

The second section deals with specific topics, particularly "hot" when approaching communication technologies, from user experience and usability to information quality, from digital divide to the social impact of mobile technologies, from legal to ethical issues, from the impact of new media onto old ones to so-called "digital natives", up to research methods on the internet.

The third and last section is aimed at mapping specific areas where Communication Technologies do play a major role, and have promoted/allowed significant changes in practices. It explores areas like commerce, workplace, marketing and PR, government, terrorism, religion, learning, health, tourism, journalism, libraries, science.

Tab. 2: Top 46 Directed Word Pairs within 3 words on either side.

Word Pair		#	Word Pair		#
social	media	310	social	networks	78
communication	technologies	217	health	information	76
virtual	communities	210	online	games	76
new	communication	183	world	wide	74
user	experience	176	new	forms	73
virtual	community	157	world	web	73
new	technologies	145	mobile	phone	72
social	network	139	wide	web	72
information	quality	131	landline	telephone	72
information	overload	116	network	theory	68
mobile	communication	111	open	access	68
virtual	reality	99	community	members	68
information	communication	98	electric	telegraph	68
united	states	97	digital	media	65
virtual	snss	96	virtual	worlds	65
new	media	92	online	communication	65
social	theory	92	electronic	governance	64
social	networking	92	health	care	64
communities	snss	92	media	communication	63
mobile	telephone	90	icts	development	63
information	technologies	89	player	communities	63
quality	information	84	no	longer	60
record	companies	80	information	technology	59

As the reader can notice, the editors have tried to be as inclusive as possible, nonetheless, the available space (and time) required to make many (difficult) choices, so to leave outside several other possible topics/perspectives.

Chapter authors have been selected for their respective prominence and leadership in the various areas, as well as with the intention to provide several voices and perspectives, and to invite scholars with different and complementary backgrounds, both in terms of geography, of disciplines, and of current affiliations.

Once all manuscripts have been collected, we have run a few statistical analyses on such corpus, so to explore some peculiarities and recurrences. Having stopped generic/irrelevant terms and other linguistic elements, and after having combined similar/identical items (e.g.: technology and technologies), the fifty most frequent items are presented in Table 1 (elaboration done with WordSmith Tools 6).

In addition to individual word frequencies as shown in Table 1, it is informative to examine words in their immediate local context in the corpus, such as frequency counts of what pairs of words occur within 3 words on either side of each word in the text (Danowski, 1993). Furthermore, by retaining the order of words in the pairs as they occurred in the text, these directed word pairs enable
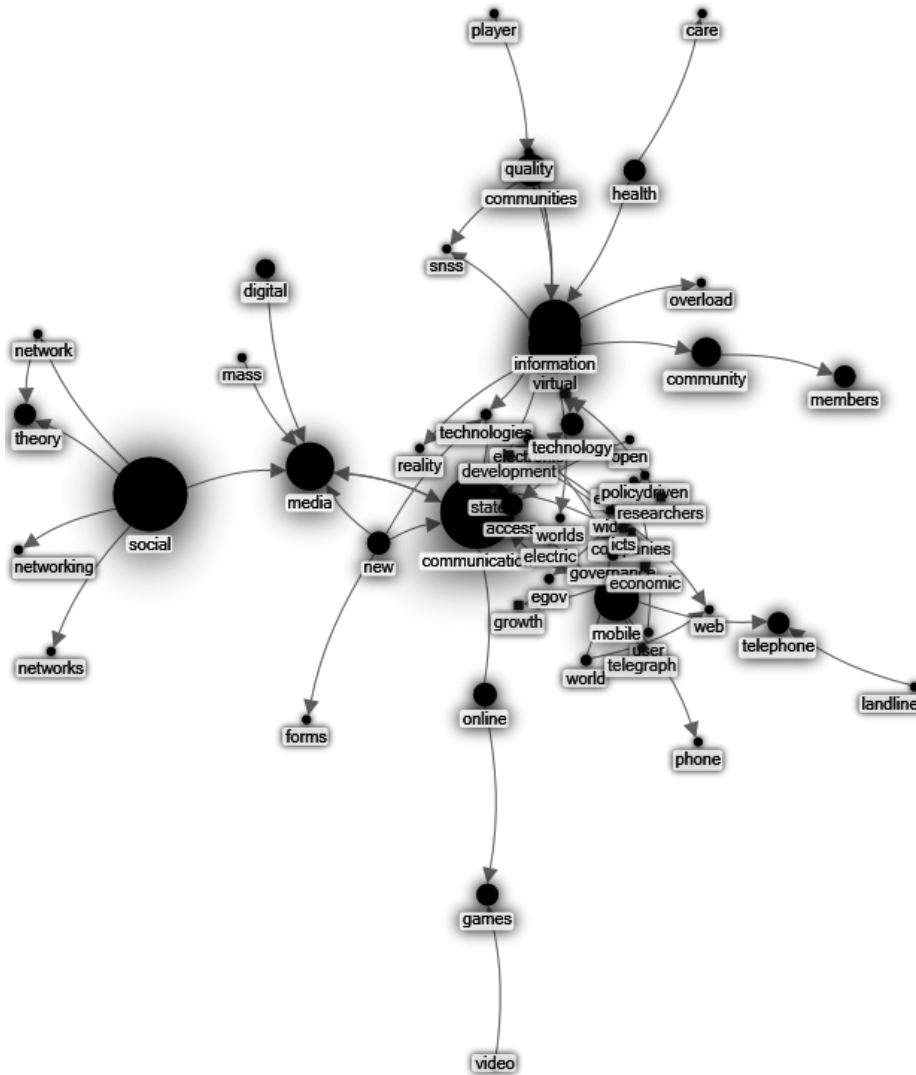
Fig. 2: Network among the top word pairs.

one to gain more detailed representations of meanings. The local context and proxemics among words provided by word-pair analysis adds value to the interpretation of the statistical analysis of the text. Moreover, when the overlaps of these words paired in the word window is graphed, it adds additional interpretative information. Strings of highly-related pairs longer than 2 words create groups of words that are more related within the group to one another than to words outside the group. For the word-pair analysis we used WORDij (Danowski, 2013), here we did not perform stemming of words to their simple roots for of significant information, for reasons discussed in (Danowski, 1993).

Fig. 3: Word-cloud of most frequent words present in the book.

Fig. 4: Word-cloud of chapters' keywords.

Once WORDij has processed the text, we used NodeXL (Smith, Milic-Frayling, Shneiderman, Mendes Rodrigues, Leskovec, Dunne, 2010) to create the optimal graph layout. The size of the nodes reflects their betweenness centrality: the lager the circle the more central the word in the overall network.

A different kind of representation is word clouds, produced by Wordle software (www.wordle.net) which are seen in Figures 3 and 4. Although one gets a more simplified representation than word networks as shown in Figure 2, the clouds are useful for a quick picture of the overall contents, ignoring specific word strings and groups. Clouds are effective for showing the overall word domain as well as relative word frequency as this is represented in the size of the word.

Tab. 3: List of words appearing at least three times among chapters' keywords.

Item	#	Item	#
social	14	online	4
communication	12	communities	3
digital	12	economy	3
media	11	games	3
web	8	learning	3
internet	7	market	3
mobile	7	mediated	3
technology	7	methods	3
information	6	new	3
electronic	5	overload	3
research	5	quality	3
virtual	5	semantic	3
data	4	systems	3
governance	4	telegraph	3
learners	4	theory	3

Hereafter, it is represented a word-cloud of the whole book, which includes more terms than the fifty above listed ones.

As it can be noted, the most prominent terms provide the very core topical area of this book: Information and Communication Technology, new (media), the internet and social (media). Also its research orientation is clearly visible, as well as different perspectives, focusing on individuals and/or on their communities.

A similar result can be achieved through a slightly different strategy. All contributors have been requested not only to provide a short summary of their chapter, but also to list some relevant keywords. If we just consider such keywords (221 in total, which might consist of more than one word), 30 words appear at least three times, as presented in the table above.

If a word-cloud is done using only such keywords, which are particularly relevant because provided by the authors themselves, the following image appears.

It's now time to introduce the three sections and each individual contribution, providing a short summary of them, adapted from their abstract section.

3 Three sections, thirty chapters

The first section is devoted to analyze the *"Mediavolution": communication media between evolution and revolution*; it approaches this task studying different semiotic codes and media.

Brett Oppegaard opens this section with a chapter titled *From orality to newspaper wire services: Conceptualizing a medium*. The very concept of "medium"

enables researchers to connect cave paintings to wearable computing, a concept in which the media form creates a setting, or environment, in which communication takes place. That environment shapes, encourages, promotes, constricts, and restricts the messages in ways that affect cultural and social behaviors, meaning the medium – through which communication takes place – also is an important part of the message, to quote a very successful suggestion by Marshall McLuhan.

Gabriele Balbi and Richard R. John present *Point-to-point: telecommunications networks from the optical telegraph to the mobile telephone*. Their chapter defines "telecommunications" and sketches the main dimensions of four telecommunications networks over a two-hundred-year period – the optical telegraph, the electric telegraph, the landline telephone, and the mobile telephone (and its predecessor, the wireless telegraph). Then, it shows how historical scholarship on topics in the history of telecommunications has been shaped by three intellectual traditions: the Large Technical Systems approach, Political Economy, and the Social Construction of Technology.

Alejandro Pardo presents a chapter on *Cinema and technology: from painting to photography and cinema, up to digital motion pictures in theatres and on the net*. After having noted that the relation between cinema and technology has been present since the very inception of motion pictures, this chapter presents a comprehensive compilation of key scholarly literature and identifies major theoretical issues and emerging concepts. It is divided into three main sections: the first one focuses on the relationship between the arts and technology, and specifically between cinema and the arts, and between cinema and technology; the second section draws a brief historical summary on the technological development of (audio)visual media, moving from the primitive canvas to the first photographic plates and from the birth of cinema to the digital image; the third part is a synthesis of some of the most relevant theoretical and critical issues regarding the imbrication of art, technology and cinema.

Tom McCourt's chapter on *Recorded music* surveys the history of recording identifying three eras: acoustic, electric, and digital. It explores also some common characteristics: first, a shifting oligopoly of record companies has controlled this process; second, each era claimed to more accurately capture sound through greater technological intervention; third, changes in recording and distribution have repurposed and decentralized music, affecting its creation and reception.

Marko Siitonen explores *Communication in video games: from players to player communities*. Digital games research and communication studies intertwine at several points: gaming, and play in general, is a social activity, and digital gaming and online game worlds offer near endless ways for self-expression and socializing. This chapter looks at questions of social interaction within the realm of online multiplayer games; the topics introduced proceed from motivations of individual players to the social dynamics of player groups and communities, to exploring games as communication systems and platforms.

Stefano Tardini and Lorenzo Cantoni present a chapter on *Hypermedia, internet and the web*. In this chapter, two of the most important instances of ICTs are introduced: internet and the web, together with the concept of hypermedia/hypertext, which played a pivotal role in the theoretical discussions about ICT-mediated communication as well as in the widespread diffusion of the internet and the web. The concept and the history of hypertext are presented, and some relevant interpretations of it are provided, borrowed from the field of communication sciences: a linguistic and semiotic approach, a rhetorical one, and a literary one. The internet, its history, diffusion and different layers are then presented, to introduce the result of the application of hypertext to the internet: the world wide web, which decreed the success of the internet as the most widespread and powerful communication technology at the beginning of the third millennium. A model to design and interpret websites is then explained: OCM – Online Communication Model.

Rita M. Lauria and Jacquelyn Ford Morie have co-authored a chapter on *Virtuality: VR as metamedia and herald of our future realities*. They examine the concept of virtual reality (VR) as an advanced telecommunications medium that transcends all that has gone before, forming, in essence, a new and advanced metamedium. By acknowledging the porous boundaries between the simulated and the "real," virtuality constitutes a phenomenological structure of "seeming," where the computer-constructed reality feels experientially authentic. After presenting a brief history of developments in VR, from both technological and more philosophical viewpoints, they explore the complementary concepts of the computer system as an active participant, and the embodiment of the human actor within the simulated reality, and discuss how the concept of virtuality serves to fuse these potential dichotomies.

Constance Elise Porter's chapter on *Virtual communities and social networks* reviews findings from previous research and identifies key scholarly issues from historical, contemporary and forward-looking perspectives. Ultimately, she calls for scholars to go beyond descriptive accounts of human behavior in virtual communities and social networking sites by developing theoretical explanations for such behavior. In doing so, the author lays a foundation upon which marketing and communications scholars might build programmatic research.

Ulrike Gretzel presents a chapter titled *Web 2.0 and 3.0*, which are summary terms widely used to describe emerging trends in the development of internet technologies. This chapter describes the technological foundations of Web 2.0 and 3.0, and discusses the economic factors and cultural/social practices that are typically associated with the two phenomena.

<p style="text-align:center">⋆ ⋆ ⋆</p>

The second section, titled *Communication technologies and their environment*, approaches specific relevant issues linked with communication technologies.

Tim Unwin's chapter opens the section dealing with *ICTs and the dialectics of development*. It provides an overview of some of the challenges that need to be considered in defining the notions of both ICTs and 'development', arguing that both must be seen as contested terms that serve specific interests. The chapter adopts a dialectical approach that first seeks to identify the main grounds for a thesis of the 'good' in the use of ICTs in development practices, it then develops an antithesis that proposes that the use of ICTs has actually increased inequality at a range of scales, and has thus worked against a definition of 'development' based on social equity. After that, it seeks to explore what a synthesis of these two diametrically opposed positions might look like.

Martin J. Eppler's chapter focuses on *Information quality and information overload: the promises and perils of the information age*. In this contribution, he presents two key concepts in the realm of modern day communication infrastructures: the prescriptive notion of information quality, and the descriptive concept of information overload, i.e.: not being able to process the provided quantity of information adequately.

Davide Bolchini's chapter discusses *User experience and usability*. It reviews key concepts related to both usability and user experience of interactive communication, coming from different disciplinary areas: computer-mediated communication, computer science, information science, software engineering, and human-computer interaction. Moreover, it seeks to synthesize a practical, integrated perspective across knowledge domains, which mainly stems from usability engineering, the growing area of user experience, and interaction design.

Brian Winston's chapter *Impact of new media: a corrective* is aimed at rebalancing the narratives about old and new media, and at demystifying the technicist hyperbolic rhetoric of the "information revolution."

Claire Hewson's chapter deals with *Research methods on the internet*. She discusses how internet technologies can be used to support primary research on the internet, or internet-mediated research (IMR). After having depicted a brief history of IMR, key methods that have been implemented in IMR are outlined: surveys and questionnaires, interviews and focus groups, experiments, observation and document analysis. Key issues and debates which have emerged in IMR are discussed, including issues of data quality, sampling and sample bias, and ethics.

Wenhong Chen and Rich Ling discuss the very emerging issue of *Mobile media and communication*. In fact, mobile telephony is the most widespread mediation technology in the world: with access to the wireless internet, mobile devices have expanded from a tool of voice or text-based communication to devices and services for multimedia communication, consumption and production. The chapter provides a brief history of mobile media and communication, highlighting the technological affordances of the mobile internet; it reviews theoretical issues and reports major streams of empirical research.

Emanuele Rapetti and Francesc Pedró present a chapter titled *Digital Natives, New Millennium Learners and Generation Y, does age matter? Data and reflection*

from the higher education context. Along the same line of B. Winston, they aim at providing a balanced answer to the very controversial question whether it exists a generation of digital(ized) learners. From the analysis of relevant literature, three different views do emerge: the "enthusiasts", the "concerned ones", and the "critics".

Joanna Kulesza's chapter deals with *Legal issues in a networked world*. She sketches the evolution of international internet governance as the background for all ongoing discussions on the appropriate legal framework for the global network. Among the discussed issues: local notions of privacy confronted with the global need for cybersecurity, national perceptions of decency and online expression exercised across territorial borders, intellectual property rights ... She points to two crucial criteria in confronting all legal challenges online: the need to reinterpret the notions of jurisdiction, and due diligence applied to online communications.

Adriano Fabris' chapter on *Ethical issues in internet communication* concludes the second section. He addresses the specific ethical problems that emerge in connection with the world of the internet, and examines different strategies used to tackle them. To this end, he distinguishes two different perspectives: "Ethics of the Internet" and "Ethics in the Internet".

* * *

The third and last section of the volume presents twelve specific areas, in which the impact of ICTs has been particularly relevant, if not disruptive.

Rolf T. Wigand explores the domain of *Commerce*. He discusses the efficiency of electronic markets, especially their gain in efficiency over traditional markets. According to the author, added value of eCommerce comes from a proper alignment of information and communication technologies, business strategy/goals, and business processes.

Kevin B. Wright's chapter deals with *Workplace relationships: telework, work-life balance, social support, negative features, and individual/organizational outcomes*. The chapter explores several theoretical frameworks that have been applied to the study of new communication technologies and workplace relationships: telecommuting, work-life balance, and negative behaviors in the workplace associated with new communication technologies, such as cyberbullying and cyber-surveillance.

Anne Linke's chapter on *Marketing and public relations* analyses the digital evolution from the Web 1.0 to the Web 2.0, which has created many challenges for enterprises and their corporate communication, and discusses how to find adequate communication management processes and structures in this new context.

Tomasz Janowski's chapter titled *From electronic governance to policy-driven electronic governance – Evolution of technology use in government* presents different

ways in which ICTs have been integrated within government-related activities and how, in turn, the government itself has been shaped by them. It outlines the evolution of government use of technology, and introduces policy-driven eGov as the latest phase in this evolution.

Aziz Douai analyses the very hot topic of *Technology and terrorism: media symbiosis and the "dark side" of the web*. He discusses the complex relationship between technology and the deployment of terrorism as a political weapon in contemporary societies. While internet's own architecture has allowed terrorists to use it to evade detection, communicate, recruit and organize, the author claims that it is important to avoid new "moral panics" about the internet, and that intrusive surveillance of regular citizens' online activities should not be justified based on them.

Pauline Hope Cheong and Daniel Arasa's chapter on *Religion* provides a discussion of religion's dynamic developments alongside contemporary communication technology connections and appropriations. It spotlights key insights from prior reviews, and examines forces of interaction and tensions in the relationships between religion and the internet. Illustrations are drawn from various religions, particularly the Catholic Church, the largest religious institution in the world.

Thomas C. Reeves and Patricia M. Reeves approach the issue of *Learning*, and examine its nature and role in the information and communication age by addressing key questions related to both formal learning in schools and informal learning through experience. The theoretical perspectives on learning presented in this chapter include behaviorist, cognitivist, humanist, constructivist, constructionist, social, and connectivist orientations.

Gary L. Kreps presents a chapter on *Communication technology and health: the advent of eHealth applications*. Powerful new health information technologies are transforming the modern healthcare system by supplementing and extending traditional channels for health communication, and by enabling broad dissemination of relevant health information that can be personalized to the unique information needs of individuals.

Alessandro Inversini, Zheng Xiang, and Daniel R. Fesenmaier explore *New media in travel and tourism communication: toward a new paradigm*. They review and highlight the most important milestones in the last two decades that changed tourism communication, focusing on three main areas of development: the persuasive nature of tourism websites, social media conversations, and mobile computing.

John V. Pavlik presents a chapter titled *Journalism: from delivering information to engaging citizen dialogue*. This chapter provides an overview of the traditions and principles of journalism and places them in the evolving context of a digital, mobile and networked world, where citizen reporters operate alongside and sometimes collaboratively with professionally educated journalists.

Stephen M. Griffin's chapter discusses *Libraries in the Digital Age: Technologies, Innovation, Shared Resources and New Responsibilities*. In fact, ICTs have chal-

lenged and are challenging the role of libraries, in particular academic libraries: comprehensive reporting of digital scholarship requires new models of scholarly communication that cannot be based only/mainly on print media. Libraries as knowledge institutions are at a unique and opportune time for examining new services and resources that support digital scholarship across the disciplinary spectrum, while also developing innovative practices that serve patrons from the broader population.

Loet Leydesdorff presents a chapter titled *The sciences are discursive constructs: The communication perspective as an empirical philosophy of science*. New communication technologies have introduced a new dynamics in the sciences: in addition to the (local) context of discovery and the (global) context of justification, a third context of mediation enables scholars to reflect on the sciences as discursive constructs.

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