

mCOMMUNICATION: THE EMERGENCE OF MOBILE COMMUNICATION WITHIN THE MEDIA ECOSYSTEM

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Abstract

Communication mediated by mobile devices is one of the most dynamic sectors of the global economy and is transforming many aspects of our social lives, including ways of relating to each other and our production, distribution and consumption of cultural artifacts. We examine these transformations of mobile communications from a media ecology perspective by applying McLuhan's Laws of Media. We also propose a research agenda for studying mobile communications.

Keywords

mCommunication, mobile communication, media ecosystem, new media, emergence

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1. INTRODUCTION

"Men are suddenly nomadic gatherers of knowledge, nomadic as never before—but also involved in the total social process as never before; since with electricity we extend our central nervous system globally, instantly interrelating every human experience" (McLuhan 1964:358)

McLuhan's quote in some sense foreshadows the emergence of cell phones, the Internet and the World Wide Web some 30 years before their arrival into the popular domain. The Web has brought new challenges to traditional mass communication studies. Mass communication theories, founded in the broadcasting logic, have undergone an upheaval since the new forms of interactive communication, combining different media, formats and languages, arrived. When these processes started to become part of research agendas, and the Web was just starting to take off, a new medium began to forge a path in the communication ecosystem: mobile devices (Scolari *et al.*, 2008, 2009).

It is now possible to say that the digitalization of the content production and distribution processes and worldwide diffusion of the Internet was only the first stage of an evolution that is far more extensive and complex. The second phase of communication digitalization has begun with two very clear trends:

- The traditional model of communication media, based on the diffusion concept (one-to-many) has been challenged by the appearance of new collaborative logics (many-to-many) (Logan, 2004; O'Reilly, 2005; Cobo Romani and Pardo Kuklinski, 2007).
- The diffusion of portable communication devices able to connect to the Internet as terminals and to receive and transmit all kinds of digital contents has opened the doors to what is now called the 'mobile Internet' (Steinbock, 2003, 2005).

From the 90s the mobile telephone has undergone a remarkable transition in its evolution process: it has stopped being only an instrument of interpersonal communication for an elite group of professionals to become a multifunctional product of the masses that connects to the Internet as one more terminal. This leads us to consider the appearance of a new form of communication: mobile communication (*mCommunication*).

1.1. A History of the Mobility of Information and the Portability of Communication Devices

We have defined *mCommunication* or mobile communication as the convergence of the mobile devices and access to the Internet. It is a relatively recent phenomenon. The mobility of information and communication devices actually has a long history predating the digital era by many centuries and dating back to the advent of written communication. One of the approaches of media ecology is to look at the future through the rear view mirror by looking at the historical precedents of any phenomenon one is studying. The communication process entails three elements the sender, the receiver and the message or the information. The mobility of the communication process therefore incorporates either the mobility of the information or the mobility of the receiver and/or the sender through the portability of their communication devices. The Internet represents the mobility of the information whereas cell phone and WiFi technology gave rise to the mobility of the receivers and/or the senders of information. Finally a third category of mobility of the receivers of information exists in terms of the ubiquity of information through broadband access to the Internet and also through RFID tags or the Internet of Things (ITU, 2005).

1.2. Literary Mobility of Information

Historic examples of the mobility of information include Roman system of command and control through the use of paper-based messages and a system of roads to move information from the center in Rome to the periphery in the provinces. The flow of information in the Roman Empire differed from the flow of information in today's Internet because all information had to pass through Rome whereas with the Internet all nodes are equal. We have the difference between a centralized communication system and a decentralized one. Another example of the mobility of information was the transformation of the manuscript codex book following the advent of printing and the miniaturization of the book by Aldus Manutius. The book now became a portable medium of information. The paperback pocket book introduced in the 20th century was another innovation that increased the portability of the codex format.

1.3. Electric Mobility of Information

The next breakthrough in the portability of information came with the electric mass media of the telegraph, the telephone, the radio, and television. For each of these media the distance between the sender and the receiver is bridged by the electric transmission of information either through electric wires in the case of the telephone, telegraph and cable TV or electromagnetic waves in the case of radio and early television. For movies, videos, recorded music and books as well an information package is physically sent from the sender to the receiver and transmitted by a special player in the case of recorded music, videos and movies.

1.4. Digital Mobility of Information

With the advent of digital media new forms of portability emerged. In the case of recorded music the Walkman and the MP3 players like the iPod allowed users to carry their recorded music with them and enjoy it wherever they wandered. The laptop computer followed by the notebook computer and the early PDAs like the PalmPilot allowed their users to carry their stock of digital information and access it wherever they went.

In addition to the portability of the devices we just described another level of the mobility of communication emerged with the Internet. Once again as was the case with electric mass media the distance between the sender and receiver of information was eliminated. The Internet allowed one-to-many communication through Web sites and one-to-one and one-to-many communication through email, IM and Twittering and many-to-many through listservs, blogs, wikis, collaborative filtering, and Web-based collaboration tools.

1.5. Portability of Communication Devices and the Mobile Access to Information

Electric media eliminated the distance between the sender and the receiver of information but the sender and receiver had to be stationary to exchange information back and forth in the case of telephone conversation or to receive information from radio or television broadcasts. The first portability of voice communication was realized with walkie-talkies or field telephones used primarily by the military and facilitated by fairly short-range radio signals.

Portable radios and later portable TVs allowed listeners and viewers respectively to enjoy their broadcasts wherever they wanted to go. The car radio is another example of the portability of broadcast radio.

With the cell phone at first installed in automobiles and later reduced in size so as to be hand held ushered in the era of the mobility of both the sender and the receiver of telephone communications.

WiFi and especially broadband allows for the mobility of notebook computer users who want to access the Internet.

The convergence of the cell phone and the PDA as represented by the Blackberry and the iPhone and a number of other similar devices combines the portability and mobility of both telephone and Internet-based communications and gives rise to the mCommunication phenomenon we study in this paper.

1.6. Ubiquity of Information

The first instance of placing information in the environment ubiquitously was the Babylonian system of legal stelea distributed throughout the empire so that all would know the law. Another example is the posting of European kings of their proclamations throughout their kingdoms. Advertising billboards are another example of ubiquitous information. Ubiquitous broadband WiFi not yet a reality except in a few isolated communities but certainly a development that will emerge in the near future is another example of the ubiquity of the access to information. One can imagine that with the universality of broadband some users of Skype equipped notebooks especially the ultra-light ones might opt to use their computer as a telephone and give up the use of a cell phone as a way of avoiding the monthly cost of using their cell phone (like *Fring*, an application of the iPhone - <http://www.fring.com>). Only time will tell which way things will go. Will the cell phone-PDA become more of a computer or will the computer become more of a mobile telephone.

Finally RFID or smart tags already in limited use is another development that will see wide scale implementations in the not too distant future in which things, places and in some cases humans will be smart tagged so that a cell phone with an RFID reader will be able to access information about objects in the field. This development is sometimes referred to as the Internet of Things (ITU, 2005).

1.7. The relevance of mCommunication

According to the studies carried out by the International Telecommunications Union (ITU) in September 2007 there were more than 3,300 million mobile telephones in the world (in 2000 this figure was only 800 thousand) (ITU, 2007). The diffusion of mobile communication has transformed the ICT landscape. By the end of 2007, almost one out of two people had a mobile phone. In Europe, penetration has surpassed the 100% mark. More than one out of 4 African and one out of 3 Asian people have a mobile phone. A high level of competition and a decrease in prices have substantially reduced the digital divide of the mobile telephone (ITU, 2006).

No other personal communication device has reached this level of penetration in society. This fast diffusion of mobile devices has caused a repositioning of the large economic and technologic actors. All companies involved in the sector, from the telecommunication operators to those who produce contents, consider mCommunication as a new frontier for their business activities. Media researchers should not close their eyes to this reality.

1.8. Mobile Communication: a definition.

mCommunication is a social practice of content production and consumption and technological appropriation carried out through the massive diffusion of multifunctional wireless devices. The diversification of the technology (mobile communication devices now incorporate an increasing number of functions, from cameras to music players, Web navigators or mini consoles for videogames) and the extended range of terminals (mobile telephones, palmtops, smartphones, iPods, etc.) have generated the support for mCommunication (Scolari *et al.*, 2008, 2009).

The telephone has evolved from being a one-to-one communication device, and has adopted new forms that are already used in the Internet (one-to-many, many-to-many, etc.). The third generation mobile devices incorporate different communication modes, from the most massive and public (receiving television) to the most personal (sending and receiving SMS messages). Between these two modes there are a wide range of possible communication and exchange forms that no other technical device offers in the same way. To some degree, the new generation of mobile devices is closer to personal computers than traditional telephones; this is why they can also be considered a *metamedium*, which is a concept that certain researchers have used to refer to the Web (Colombo, 1996).

In synthesis we can say that mCommunication is a phenomenon within the confluence of a series of properties and functions:

- Ubiquity and the ability to be carried (communication anywhere, anytime)
- Convergence of functions, media and languages (metamedium)
- Integration of communication models (broadcasting, unicasting, multicasting, etc.)
- Bidirectionality (consumption and production of contents)
- Contents and services designed according to localization.

In the following sections we'll develop a series of theoretical reflections on mobile communications in the context of an ecology of media. The metaphor of the 'ecosystem' is one of the most suggestive for analyzing the appearance of a new "species" in the media system and for identifying the consequences of this. Like in biological ecosystems, the arrival of a new species transforms the entire environment and promotes the emergence of original inter-media configurations.

One can expect the functionality of the metamedium of the Internet accessible cell phone to increase with time. We would suggest that perhaps the inclusion of a RFID reader might be the next step (Logan, 2009, Chapter 50).

2. NEW MEDIA EMERGENCE

From a theoretical perspective it is almost impossible to continue talking about 'new media'. Is television a new media? It used to be a new media in the 1950s. The same may be said for radio in the 1920s or cinema at the beginning of the 20th century. Some

researchers agree that the ‘newness of new media is, in part, real, in that these media did not exist before now. But taking these changes into account does not mean abolishing all history because it (history) is full of similar moments of newness’ (Lister et al., 2003: 3). All media were once new media (Gitelman, 2006; Gitelman and Pingree, 2003; Zielinski, 2006). Typewriters, optical telegraphs, vinyl record albums, eight-track tapes and walkmans are (today) old media, but ‘they were not always old, and studying them in terms that allow us to understand what it meant for them to be new is a timely and culturally important task’ (Gitelman and Pingree, 2003: xi).

Even blogs, one of the newest expressions of digital communication environments, are on the brink of being considered an ‘old media’:

‘The blogosphere, once a freshwater oasis of folksy self-expression and clever thought, has been flooded by a tsunami of paid bilge. Cut-rate journalists and underground marketing campaigns now drown out the authentic voices of amateur wordsmiths. It's almost impossible to get noticed, except by hecklers. And why bother? The time it takes to craft sharp, witty blog prose is better spent expressing yourself on Flickr, Facebook, or Twitter [...] Twitter — which limits each text-only post to 140 characters — is to 2008 what the blogosphere was to 2004’ (Boutin, 2008).

Therefore, ‘new media’ is a relative concept: in twenty or thirty years time Web logs and online journals will be considered ‘old media’. [1]

In the 1990s media researchers had a unique opportunity: to study in real-time the emergence of a ‘new media’, that is the World Wide Web. The last ‘new media’, television, had been born fifty years earlier, when media studies was not fully consolidated and was still looking for its own place (and its legitimacy) in the context of the social sciences. The arrival of a new generation of digital interactive media that was no longer based on the broadcasting logic challenged the knowledge about traditional mass communication and permitted the development of new theoretical and methodological tools for ‘new media’ analysis (Logan, 2009; Scolari, 2008a, 2009).

2.1. An ecological approach to new media emergence

"A new medium is never an addition to an old one, nor does it leave the old one in peace. It never ceases to oppress the older media until it finds new shapes and positions for them" (McLuhan, 1964:278)

The study of the new born World Wide Web included an element that was not present when former ‘new media’ like cinema or radio were born: an ecological vision of the media system. Cinema, radio and even television were studied as a single medium and not as a part of a complex ecology of communication. Marshall McLuhan’s often polemical but always pertinent contributions have led to media research taking on a more integrated and ecological view of the communication system (McLuhan, 1964).

In a few words: it is almost impossible to continue analyzing a single medium (cinema, radio, television, press, the Internet, etc.) isolated from the rest of the media ecosystem; media research needs to abandon ‘mono-mediatic’ approaches and adopt an ecological vision of the media system, paying particular attention to inter-media relationships. This integrated approach, first developed by Marshall McLuhan, can also be recognized in

different research fields, from semiotics (Lotman's concept of 'semiosphere') to media studies (Bolter and Grusin's concept of 'remediation') and cyberphilosophy (Lévy's concept of 'socio-technological network').

2.2. Emergence of new media: first reactions

How did communication researchers react to the 'new media' diffusion in the 1990s? Two opposing positions can be identified. Critics of digital media often denied that there had been any substantial change at all. Such critical accounts of new media 'frequently stress the continuity in economic interests, political imperatives and cultural values that drive and shape the "new" as much as the "old" media' (Lister et al., 2003: 3). For the critical continuity supporters there was no 'new thing' in the 'new media'. Supporters of digital media often insisted that everything had changed and that society was moving forward to a new digital world. From this point of view digital technology would create a more democratic and equal society. For the supporters of uncritical discontinuity there was only 'new media' (Scolari, 2008a, 2009).

It is premature to extend this analysis to mCommunication academic discourses. For many researchers mobile devices are still 'telephones', a basic technological gadget out of the range of media studies. However, a theoretical approach to the emergence of mobile media should stay away from these sterile discussions and avoid Manichean oppositions. The pertinence of mCommunication for media studies is no longer a point of discussion: mobile devices are now part of the media system and will soon be considered simply 'one more medium' like television, radio or the World Wide Web.

Until recently, research into the mobile device sector has mainly taken the form of applied technical studies (studies based on the development of hardware or software for the functioning of these devices), sociological studies (investigating the uses and the social impact) or economic analyses (studies of the mobile telephone market, commercial strategies and business models). However, research about mCommunication from the media studies perspective is continuously growing (see for example Nilsson *et al.*, 2001; Aguado and Martínez, 2006, 2007, 2008a, 2008b; Groebel et al., 2006; Goggin, 2006; Logan, 2009; Scolari *et al.*, 2008, 2009).

3. mCOMMUNICATION: A RESEARCH AGENDA

A first research agenda of mCommunication from the perspective of media studies should include at least the following items:

- Analysis of mCommunication production and consumption practices;
- Analysis of mCommunication contents;
- Analysis of the emergence of mCommunication in the context of the media ecosystem and the process of media convergence;
- Analysis of the impact of the mCommunication metamedium independent of its content in the spirit of McLuhan notion that 'the medium is the message'. What is the 'message' of the mCommunication metamedium?

3.1. Production and consumption research

While there are hundreds of books, papers and articles about mobile consumption practices (it is obviously one of the favorite research objects of telecommunication and content production companies) investigation into content production for mobile devices is still in

its initial stages. This research sector needs to analyze the production of different content genres for mobile devices (news, videogames, advertising, etc.) and the production routines. For example recent studies of the mobile industry in Spain (Scolari *et al.*, 2008, 2009) have identified two different company profiles in mobile content production:

- Companies of recent origin created after 2000 that were formed exclusively for mCommunication (*native companies*);
- Consolidated companies that incorporated the mobile media into their traditional products after the year 2000 (*migrant companies*).

Native companies tend to be formed by a group of young professionals who decided to work together, or as a new company within a larger one that is consolidated in another sector (computing, audiovisual, etc.). Migrant companies are companies that come from other markets, for example audiovisual production, journalism or the Internet, which have included contents for mCommunication devices in the products they offer. Research about mobile content production should go deeper into these aspects, for example, by analyzing the news-making process for mobile media or the internal organization of mobile content companies (workforce, production routines, etc.).

3.2. Contents

As Marshall McLuhan said, ‘the content of any medium is always another medium’ (1964: 23). When a ‘new media’ is born, the first reaction of producers is to pick up contents from another media and introduce them into the new channel. In the beginning this process is carried out without any kind of translation; in a second phase, contents are adapted to the ‘new media’. Finally, the former ‘new media’ becomes stable and generates its own grammar; when this stabilization takes place it can be said that the ‘new media’ has transformed into an ‘old media’. The World Wide Web went through these three models: online newspapers originally introduced news directly from printed journals, then adapted these contents to the Web, and finally activated the production of specific news. Nevertheless, these three content production models should not be considered a sequence because different kinds of contents may be found simultaneously in the same media.

In this first phase of the evolution of mCommunication it is possible to identify specific, adapted and non-adapted mobile contents. Specific contents are created especially for mobile devices, while adapted contents, which generally come from the Web or television, are transformed in order to be distributed through this new channel; finally, non-adapted contents arrive directly to the mobile device without having been transformed. The recombination of different genre and the appearance of hybrid products is another main trait of content production for mobile devices. In many cases the boundary between a videogame and a marketing product is blurry. For example many marketing strategies are decidedly transmediatic (Jenkins, 2006) and include videogames for mobiles, MMS, videos on Youtube, traditional advertisements and television spots (Scolari *et al.*, 2008, 2009).

After SMS, videogames and applications, the next ‘killer contents’ in mCommunication seem to be user-generated contents and mobile television. The convergence between technical aspects and consumption practices has led to the hybridization of mobile devices and the Web 2.0 (O’Reilly, 2005; Cobo Romani and Pardo Kuklinski, 2007), to generate a new space called *mobile Web 2.0*. If the mobile Internet defines using the Internet on mobile devices, the mobile Web 2.0 refers to using and producing content via mobile

devices in social networks and in all Internet applications in which the contents are generated by the users (Jaokar and Fish, 2006; Pardo Kuklinski *et al.*, 2008).

According to Lotz television is expanding ‘outside the box’ (2007: 49). Kumar considers that mobile television is emerging as the killer application of the 21st century: ‘Mobile TV, the newest addition to the mobile services portfolio, is a sunrise technology with a potential user base of over 200 million by 2011’ (2007: xiii). In the societies where mobile television has already been adopted the ‘new media’ is radically changing viewers’ experience and advertising strategies (Orgad, 2006).

In a few words: mCommunication researchers should pay particular attention to the emergence of new content production logics (mobile 2.0) and the contamination between traditional media and the new mobile devices (mobile television).

3.3. Media convergence

One of the richest aspects of the emergence of mCommunication is the convergence between mobile devices and the rest of the media.

‘Handheld devices, mobile communications and conventional media are converging. Traditional media such as newspapers, radio and television have set the standards for information quality, accuracy and delivery. And it appears that mobile IT users expect accurate, timely and high quality information delivered through reliable channels [...] Interest in a particular aspect and/or personal preference may influence the choice of media channel, but fast retrieval of up-to-date information is usually more important. As soon as a media channel proves to be either inaccurate or fragile, the consumer will abandon it for a more reliable alternative. The rapidly increasing penetration of sophisticated mobile IT into society, and the demands users make on that technology, indicates that a new research area of “mobile media” is emerging’ (Nilsson *et al.*, 2001: 38).

However, convergence is never simply a matter of merging discrete technologies. The ‘new media’ are also adopting the aesthetics of traditional media, like television.

‘On the TV screen, as on the screens of the iPod and mobile telephone, convergence is at once a technical and aesthetic process that entails the hybridization of hardware and cultural forms [...] Today, it is imperative that we look past the glossy surface of the iPod or the sleek profile of the Motorola RAZR and concentrate our attention on the images contained on these devices’ tiny screens. For when we look closely, we find in these devices’ matchbook-sized screens concentrated versions of properties that have long been central to our understanding of television’s formats, narratives, and styles’ (Dawson, 2007:247)

This contamination between ‘old’ and ‘new’ media is the basis for understanding contemporary television (Scolari, 2008b, 2008c). As we mentioned earlier, the arrival of new ‘species’ in a technological system generates adaptation movements that affect the entire environment. The convergence between mobile devices and traditional media should occupy a central place in the new communication research agenda.

3.4 The 14 Messages of mCommunication

In the spirit of McLuhan's aphorism 'the medium is the message' Logan (2009, chapter 5) has identified fourteen characteristics or 'messages' of digital 'new media' which apply with equal validity to the metamedium of mCommunication we are studying in this paper. They are:

1. Two-way communication;
2. Ease of access to and dissemination of information;
3. Continuous learning;
4. Alignment and integration;
5. Community;
6. Portability and time flexibility (time shifting), which provide their users with freedom over space and time;
7. Convergence of many different media so that they can carry out more than one function at a time and combine as is the case with the camera cell phone that operates as phone but can also take photos and transmit them;
8. Interoperability;
9. Aggregation of content;
10. Variety and choice to a much greater extent than the mass media that preceded them and the long tail phenomenon;
11. The closing of the gap between (or the convergence of) producers and consumers of media;
12. Social collectivity and cooperation;
13. Remix culture;
14. The transition from products to services.

4. mCOMMUNICATION AND MEDIA ECOLOGY

4.1. McLuhan's Laws of Media (LOM)

As part of his media ecology approach McLuhan developed a set of rules, which he called the Laws of Media (LOM) (McLuhan, 1975; McLuhan and McLuhan, 1988) for studying the effects of media or technologies, which specifically illustrate their counterintuitive nature and hints at their evolution. A LOM consists of the following four laws:

- | | |
|----------------|--|
| 1. Enhances: | Every medium or technology enhances some human function. |
| 2. Obsolesces: | In doing so, it obsolesces some former medium or technology, which was used to achieve the function earlier. |
| 3. Retrieves: | In achieving its function, the new medium or technology retrieves some older form from the past. |
| 4. Flips into: | When pushed far enough, the new medium or technology reverses or flips into a complementary form. |

4.2. Law of media applied to mobile devices

We present a number of LOM for various mobile information and communication media to provide the reader with more of an insight into the nature of each of these media. The reader is invited to come up with their own LOM for each of these media. Unlike the laws

of physics where there can be only one version of a law LOMs admit different interpretations each with a different insight into the effects of the medium under consideration. One can generate more than one LOM for each medium, (i.e. more than one entry for enhances for example) as we have done below and each new LOM generated will yield a slightly different insight into the nature of the medium. The LOMs presented here are just examples of a possible LOM for each medium. Therefore feel free to generate your LOM for each of the different media we have treated here and by all means make use of the LOM technique when trying to understand the nature and impact of a new medium.

LOM for the codex book

Enhances: the storage of and access to information

Obsolesces: oral tradition and myths

Retrieves: memory

Flips into: the e-book and the SmartBook

LOM for electric media

Enhances: mass communication

Obsolesces: the printing press

Retrieves: oral culture

Flips into: digital “new media” and the global village

LOM for digital “new media”

Enhances: interactivity, access to information, and two-way communication

Obsolesces: mass media

Retrieves: community as in a global village

Flips into: hyperreality

LOM for the cell phone

Enhances: the mobility of telephone communication and its accessibility, co-ordination of social activities

Obsolesces: the landline,

Retrieves: nomadic existence

Flips into: a lack of privacy

LOM for the Internet

Enhances: the connectivity of computer users,

Obsolesces: teletype and fax and the specialist as the source of information,

Retrieves: community as in a global village,

Flips into: information overload and deception.

LOM for email (or IM or SMS)

Enhances: personal communication,

Obsolesces: fax,

Retrieves: postal service,

Flips into: spam.

LOM for the World Wide Web

Enhances: two-way communication, access to information, and continuous learning.

Obsolesces: academic journals, newspapers, and paper-based communication in general,

Retrieves: alignment and community,

Flips into: the content of mass media including Web games, music, radio, and TV.

LOM for WiFi

Enhances: access to the Internet,
 Obsolesces: wires and dial-up connection to the Net,
 Retrieves: ESP,
 Flips into: nomadic gatherers of knowledge.

LOM for RFID or smart tags

Enhances: access to information associated with objects and places,
 Obsolesces: the bar code and the label,
 Retrieves: identification,
 Flips into: Internet-based information.

LOM for mCommunication

Enhances: the process of communication and the access to information,
 Obsolesces: the landline and desktop access to the Internet,
 Retrieves: nomadic existence
 Flips into: information obsession.

5. CONCLUSIONS

The objective of this article was to reflect on mCommunication in the context of an ecology of media. From the perspective of communication studies mobile devices can be considered the 'new' new media, with all the theoretical, methodological and epistemological consequences that derive from this. Due to its newness, mCommunication is now entering the media studies agenda; however, it is necessary for it to become a more integral part of the research into traditional or interactive media.

Research into mCommunication from the media studies perspective has only just begun and has a long way to go. To follow this path it is necessary to understand that a new communication medium has entered the cultural industry, a medium with its own business models, grammar, production practices and consumption dynamics.

Unlike other historic moments, for example the birth of cinema or radio, media studies already has the theoretical, methodological and analytical elements for studying the appearance and development of a new 'species' within the mediatic ecosystem. The consequences of this apparition will be felt in the entire communication system, which makes it necessary to include mCommunication in researchers' agendas as well as any other related areas, from consultant agencies to the entities that establish the sector's policies.

Notes

- (1) To avoid entering into a semantic discussion about 'new media', in this article we'll continue to use this term, but in inverted commas. For an analysis of the semantic limits of 'new media' and the construction of a theory of digital interactive communication, see Logan (2009) and Scolari (2008, 2009).

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