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Pervasive Technologies and the Paradoxes of Multimodal Digital Communication

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Abstract

Contemporary societies are greatly challenged by paradoxes in all facets of life. Digital communication encodes and produces meaning by making use of these contradictory relations. In this contribution, three digital paradoxes will be presented. The first paradox is grounded in the process of remediation in digital settings which mirrors a contradictory double logic. Digital culture, in fact, wants both to multiply its media and to eliminate all traces of mediation. The second antinomy has its origins in the new concept of linguistic entropy: a structured information disorder that is regulated by usability and multimodality. In accordance with the second paradox, the third one stems from further processes that are framing, a multimodal resource, and linking, a hypertextual resource.

Keywords: *entropy, linking processes, multimodality, paradox, (re-) mediation*

1. Introduction

The aim of this contribution is to underline the fact that digital technology along with its affordances augment the presence of contradicting relations in contemporary societies and that multimodality should pay more attention to these antinomies, which are the bases of the representations and understanding of technology. This paper also seeks to provide some insights into how the pervasiveness of technology accelerates the upsurge of paradoxes in digital communication at a theoretical and conceptual level. There are, in fact, two crucial facets of our society where critical paradoxes find their origins. One facet is the massive presence of social media in our daily routines

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and the other is the endless flow of information exchanged via networks. The description made by Castells (2001) of our present-day society as a "network society" perfectly depicts this process. In both aspects multimodality plays a fundamental role since it is impossible to conceive of digital social practices as represented exclusively by monomodal semiotic systems. Language is performative by nature inasmuch as it performs one's thoughts and messages in the external world within actions, events and artefacts. In real life humans are the actors who perform their communicative actions; in digital space these actions are acted out through the mediation of technologies. This entails a further modelling process in which, once more, multimedial devices are embedded and the multimodal potential is exploited.

At the same time, digital communication also encodes and produces signs and meanings by making use of contradictory relations that are constantly augmented by the affordances (Gibson 1977) of pervasive social media and their simultaneous use of multimodal resources. And these affordances affect the way we negotiate mediated social practices since they act as ideological tools. This last complex issue will be investigated by using Kaplan and Haenlein's framework (2010) in the following section, after presenting the transformation of our society into the Information(al) Society. Following on, three important paradoxes rooted in digital communication will be illustrated. The first paradox is grounded in the process of remediation (Bolter and Grusin 1999) in digital settings, which mirrors a contradictory double logic. Digital culture, in fact, wants both to augment its media (hypermediacy) and, simultaneously, to remove all traces of mediation (transparent immediacy). The second antinomy has its origins in the new concept of linguistic entropy (Petroni 2011): a structured information disorder that is regulated by usability and multimodality. In connection with the second paradox, the third stems from further processes that are framing (Kress and van Leeuwen 2006 [1996]), a multimodal resource, and linking, a hypertextual resource. The dichotomy between disconnection and connection is always present in digital texts and enhanced by the multimodal and hypertextual nature of digital settings. At this stage, uncovering these contradicting relations between semiotic resources and investigating their deep mechanisms are the first steps towards a future semiotic and multimodal interpretation of the phenomenological realities of digitality.

2. Information(al) Society and Social Media

Over the last decades we have been living in the age of digitality and witnessing the transformation of society into the Information Society. Castells (1996, 2001) identifies the reasons for this transformation in the shift from the Gutenberg Galaxy (McLuhan 1962) to the Internet Galaxy (Castells 2001) and ascribes to the Internet the role of main actor. The sociologist underlines

a difference between the "typographic mind" and the "network mind" produced in different social and cultural periods of the history of societies. The first one simulates the typographic-produced text, the result of a traditional linear process of encoding and decoding meaning, and the second is the result of a non-linear, network-like and multi-layered signs-making, reasoning and interpreting process that is evident in digital societies.

Networking as a social practice, applied to any representation of social organization, has re-shaped every area of human activity and society. Thanks to the network, we have created new systems of communication, new media and sources of information, new forms of political and cultural expression, new forms of teaching and learning, and new communities. Communication cuts across every field of knowledge. With the Internet being the medium through which information and knowledge are potentially accessible and shareable by all today, it represents *de facto* the pivot of the global world. The World Wide Web is a huge virtual environment where human beings communicate with each other without any space and time constraints, thanks to computer mediation. This allows the accumulation of knowledge to be diffused throughout the world, which in turn generates an increasingly complex system of information management and so on *ad infinitum*. In this context, processing information means generating new knowledge. Of course, the cultural sphere is involved in these changes. In fact, the close link that today exists between culture and productive forces is determined precisely by the existence of a knowledge-based information technology – what Castells defines as "informationalism" – that changes the way in which we produce ideas and contents and how we encode and decode them. We should consider ourselves members of this global society that is commonly defined as the Information Society. But the distinction Castells makes between the concepts of "Information Society" and "Informational Society" is worth noting. As the author claims,

> … information is the portion of knowledge that human beings share with one another and it is the foundation of all intellectual and cognitive activities of societies. By contrast, the term Informational indicates the attribute of a specific form of social organisation in which information generation, processing, and transmission become the fundamental sources of productivity and power, because of new technological conditions emerging in this historical period. (Castells 1996, 21)

Social behaviours related to this complex process have very often generated different, and sometimes contradictory, phenomena in digital communication. On the one hand, for example, there is the need to share an international language and common codes in specific Internet domains; on the other, the wish to maintain our identity and to be ensured that information and knowledge can still reflect our Selves through our own language is wholly satisfied by choosing different languages and culture-bound codifications in other online environments.

So far, the use of the terms Internet or Web has been based on a general view of the phenomenon itself. But in order to better understand the role of digital technology in accordance with its evolution, it is necessary to make a distinction among different concepts that today are generically used to refer to the potentialities of this technology. They are Web 2.0, Social Media and User Generated Content (UGC). When the Internet was used by common people for the first time, it was simply a huge Bulletin Board System (BBS) allowing users to exchange information such as data, news and messages. At the end of the 1990s the extraordinary surge of websites, corporate webpages, e-commerce sites and personal blogs, forums, mailing lists etc. started to design new modalities of interaction mediated by computers, mainly known as Computer-Mediated Communication (CMC). All of this took place on a platform named Web 1.0 where the sign-maker, the content producer, was solely the conventional Author. With the advent of Web 2.0 in 2004, the transformation of the roles played by software developers and end-users had as a result the possibility of producing applications, and thus meaning, not individually but through an endless process of participatory and collaborative creation by enabling a form of content sharing that is totally different from, and more powerful than, the BBS. Web 2.0 is the platform for the evolution of social media, a group of Internet-based applications that are grounded in the ideological and technological foundations of Web 2.0 and that allow the production and exchange of UGCs, i.e. the several forms of media content that are free online and generated by users (e.g. collaborative projects like Wikipedia, blogs with the possibility to post personal comments, content communities like YouTube, social networking sites like Facebook, virtual game worlds, and virtual social worlds like Second Life). It is possible to state that the real networking potential identified by Castells in this medium is perfectly instantiated and exploited by social media, and this explains why today the "old" representations of networking – websites, portals, search engines etc. – integrate their layout with a social networking area.

Social media involve the simultaneous use of different media thanks to the potentialities of the new digital technologies. Multimediality, in turn, implies multimodality, that is to say how we encode and decode socially-situated meanings through the combination of diverse semiotic modes[1]. It would be impossible to investigate semiosis and multimodality separately, since they feed each other and work jointly in meaning-making processes via media technologies.

[1] The majority of the studies concerning multimodality are based on Kress' paradigm and on his research conducted in the last decades (2003, 2010) also with van Leeuwen (2001, 2006), Jewitt, Ogborn and others (1996, 2001, 2005). Needless to say, this theory has been influenced by social semiotics which, in turn, stems from contemporary semiotics where Hjelmslevan meaning stratification, Peircean semiosis, and Hallidayan functional linguistics have played important roles.

Both meaning construction and the relative semiotic systems of representation blur, or rather blend, their boundaries: a continuous mechanism that is enhanced and endorsed by the affordances of the medium. Iedema, in his analysis of discourse as a multi-semiotic practice, emphasises that "the trend towards a multimodal appreciation of meaning making centres around two issues: first, the de-centring of language as favoured meaning making; and second, the revisiting and blurring of the traditional boundaries between roles allocated to language, image, page layout, document design, and so on" (2003, 33). Semiosis, in terms of sign production, and multimodality are always intertwined in any human, social, and cultural discourse practice, but the mediation of new technologies within these practices and the influence of globalisation and informationalism have revised and re-shaped their relationship.

Given these premises, Petroni (2011) proposes to use the term "hypermodality" instead of traditional "multimodality" whenever we analyse digital artefacts through the multimodal approach. Already in 2002, Lemke makes use of this term stating that

> hypermodality is more than multimodality in just the way that hypertext is more than plain text. It is not simply that we juxtapose image, text, and sound; we design multiple interconnections among them, both potential and explicit… Hypermodality is the conflation of multimodality and hypertextuality. Not only do we have linkages among text units of various scales, but we have linkages among text units, visual elements, and sound units. And these go beyond the default conventions of traditional multimodal genres. (300-301)

Clearly, what enables hypermodality and hypertextuality to be actualised is the process of linking, or rather hyperlinking, and the creation of semantic trajectories. Hypermodality, therefore, is the means analysts use to examine not only how many modes and resources meaning construction is based on but also why and how those resources have been deployed, and why the same meaning has been reified and materialised through different media.

Turning to the concept of social media and to their pervasiveness, it is interesting to notice that some of the theories in the fields of media research and social processes are useful to classify the various types of social media (Kaplan and Haenlein 2010). The theories of media research are social presence – the degree of more or less direct interactions in time and space engaged between interlocutors (Short, Williams and Christie 1976) –, and media richness – a greater or lesser amount of information to be transmitted between participants, in order to avoid ambiguity and uncertainty (Daft and Lengel 1986). The theories of social processes are self-presentation – the modes by which the user represents him/herself (Goffman 1959) –, and self-disclosure – the conscious or unconscious degree of disclosure regarding personal information (e.g. thoughts, feelings, likes, dislikes) that mirrors the image the user would like to give. If we combine these four parameters focusing on so-

cial media, we shall see that blogs and wikis have the lowest score in terms of social presence and media richness since they are mostly text-based and enhance less complex interactions, whereas virtual social worlds (e.g. Second Life) and virtual games have the highest score; social networks and content communities (e.g. YouTube) are in-between. With respect to self-presentation and self-disclosure high scores belong to blogs, social networks and virtual worlds whereas low scores to wikis, content communities and virtual games.

In conclusion, the study of social media and digital communication embraces many fields of research and, as Lunt and Livingston (2001) argue,

> a considerable body of research from diverse disciplines over the past century has traced the complex and subtle ways in which the media have become an integral part of our everyday lives, implicated in the structuring of our domestic practices, our social relationships, our very identity… By contrast, the force of intellectual developments across many disciplines, most obviously media and communication itself, is to recognise the nature of the media as multifaceted artefacts embedded in a production-consumption cycle of considerable complexity which is in turn embedded in economic, political, cultural and psychological structures of modern society. (<http://eprints.lse.ac.uk/1006/>, 10/2014)

And it is exactly this complexity that will be now analysed by focusing on the contrasting relations which reside in multiple semiotic systems such as digital multimodal artefacts.

3. Paradoxes of multimodal digital communication

Contemporary societies are greatly challenged by paradoxes in all facets of life, as antinomies are intrinsic in human social practices and are embedded forces in any cultural system. Since the ancient times, philosophers, scholars and also artists have investigated the phenomenological nature of paradoxes (in modern times, we have Baudrillard, Picasso, Peirce, Eco and many others who have contributed to the analysis of this issue). Model building is a cognitive activity of human beings, which is necessary to make the world understandable. Yet understanding, and hence knowledge, from a semiotic point of view, can not be achieved just by means of a perfect model, but requires instead a continuous interchange between contradicting models (Kull 2005). It is what Meno's paradox, the famous paradox of learning, teaches us. It was elaborated in the Platonic dialogue *Meno*, and it claims that we cannot search for what we do not know and we do not need to search for what we already know. Jurij Lotman (2009 [1992]) states that non-understanding seems to be as valuable a mechanism of meaning as understanding. When we confront the dialectics between opposing models or systems, the consequential paradoxes can provide chances for engaging in critical meaning-making processes. The way we cope with contradictions can

shed light on the nature of multiple semiotic processes. The three "digital" paradoxes we are going to present are the following: remediation (hypermediacy *Vs* immediacy), entropy (informativity *Vs* usability), and framing and linking (disconnection *Vs* connection).

3.1 Remediation

Traditionally, by remediation we mean a shift from an old medium, an old technology (e.g. writing), to a newer one (e.g. printing). McLuhan states that

> the "content" of any medium is always another medium. The content of writing is speech, just as the written word is the content of print, and print is the content of telegraph. If it is asked, "What is the content of speech?", it is necessary to say, "It is an actual process of thought, which is in itself nonverbal." An abstract painting represents direct manifestation of creative thought processes as they might appear in computer designs. (2003 [1964], 8)

Today remediation is not limited to technologies of writing. According to Bolter and Grusin's framework (1999), new visual media embody their cultural significance precisely by borrowing from, paying homage to, rivalling, and refashioning earlier media: photography remediates painting, film remediates stage production and photography, and television remediates film, vaudeville, and radio. But social media remediate television, radio, TV, news, journals, letters (email), and face-to-face conversation (chat) simultaneously, even when combinations are different.

Now remediation has a double logic that entails an antonymic relation. Social media and their representations want both to multiply their media, a process defined as "hypermediacy" by the authors, and, at the same time, to eliminate all traces of mediation, defined as "transparent immediacy". Paradoxically, they want to delete their media in the very act of multiplying them (Petroni 2011). The double logic of hypermediacy/immediacy expresses the tension between conceiving of a visual space as mediated and, at the same time, as a real space that lies beyond mediation.

Hypermediacy, therefore, is "opaque" and juxtaposed since it is instantiated by the continuous contact with the interface, that is the mediator between users and what is represented within the verbal and visual space via multiple semiotic resources. For instance, many websites (e.g. online newspaper sites) make use of the monitoring function of broadcast television and present images or videos from digital cameras, the point-of-views of which observe and depict the world for the Web. However, web designers never acknowledge television as the medium that they are refashioning, although they constantly repurpose earlier visual point-of-view technologies in combination with other resources, such as verbal texts, audio/sound, and graphics.

Immediacy is "transparent" since it is perceived as "interfaceless" and immersive. Users can interact directly with what is represented within verbal and visual space, as happens in Virtual Worlds or Social networks. Virtual games, for example, are virtual reality applications whose aim is to "inspire in the player a feeling of presence" (Bolter and Grusin 1999, 48), a new agency, through which s/he feels part of the environment reproduced, makes decisions and influences the sequence of events. All this happens by means of an "interfaceless interface" (23), where the player can move in, around and through information without buttons, tool-bars or links. On the contrary, immersive virtual reality also refashions both television and film: it depends on the conventions and associations of the first-person point of view or subjective camera.

Both transparency/immediacy and opacity/hypermediacy strive to go beyond representation and into the Real. If the logic of transparent immediacy allows us either to delete or to make automatic the act of representation[2], the logic of hypermediacy endorses multiple acts of representation and makes them visible.

Social media are built up through a remediation of all technologies and this process allows them to produce and gather an overabundance of contents. On the contrary, these contents need to be organised and managed according to established usability guidelines (Nielsen 2000) in order to be consumed: which is exactly the next paradox.

3.2 Entropy

Information overload is an innate feature of digitality. Social media are *loci*, spaces, where information overload and informativity reside and must cope with usability and technical constraints. According to de Beaugrande and Dressler's framework, informativity indicates the extent to which content is known *Vs* unknown or expected *Vs* unexpected for the receiver (1981, 9). Of course, the processing of highly informative representations is more demanding in terms of inferences but correspondingly more attractive and interesting, whereas a low degree of informativity occurs when a self-evident truth is presented.

[2] Hypermediacy and immediacy can be related to the concepts of foregrounding and backgrounding elaborated by Halliday (1982). He argues that in a multimodal account of a real (not mediated) practice or representation, its semiotic complexity is not shown by the hierarchy between or among different semiotic systems but by their nearly total integration. Even when a representation (e.g. a printed article) may foreground one semiotic resource (verbal language) over the others, this foregrounding is mostly followed (or attained) by the backgrounding or automatisation of other semiotics (page layout, font, images, etc.), that is to say, by their being perceived so normal and natural as to become invisible (or transparent). Meaning construction derives from both foregrounding and backgrounding.

Social media encapsulate countless forms of information and communication, countless discourses, and countless visualisations of the world. Their potential resides both in their affordances and in the users' ability to manage and consume a huge amount of information respectively. Multiple *stimuli*, due to the overabundance of information received during these processes, can provoke uncertainty and disorientation. Baudrillard (1985, 100), in fact, points out this paradox: "It is a question here of a completely new species of uncertainty, which results not from the lack of information itself and even from an excess of information. It is information itself which produces uncertainty". The result of this phenomenon is the need to transform this endless space into a socially or subjectively meaningful place through a complex architecture of signs which includes linguistic, visual and sound patterns.

Furthermore, attempts to measure the information content of a language and its compressibility have been made long since (Shannon and Weaver 1949). In order to quantify the notion of information content, scholars utilise the concept of entropy that, in Physics, represents the measure of the amount of disorder – or energy – in a physical system. Transferring this notion to Information Theory, entropy measures the abundance (high) or scarcity (low) of information within a signal, a sign. The greater the number of possible alternatives at a given point – deriving from the abundance of signs and consequently of sign systems – the higher will be the information value when one of them occurs.

Therefore, the second element in contrast with information overload, or high entropy, is usability. Information architecture, or usability, dictates the regime thanks to which all semiotic resources conveying information, knowledge, and interaction are regulated. The main restrictive rules pertain to the verbal mode that is required to be readable, concise and plain. As Petroni (2011) demonstrates in her research[3], this mechanism deprives information content of its potential: what language loses is the rhetorical salience, its condition of being noticeable, the degree to which signs attract the receiver's attention (Kress and van Leeuwen 2006 [1996]). When a website, for instance, is not very usable because usability rules are not followed, i.e.

[3] Petroni applied her framework to a case study of the restyling of the Nebraska official website carried out by Nielsen. His experiments had aimed at improving usability at the language level in the homepage by following the main usability guidelines that are: be succinct and concise (write no more than 50% of the text you would have used for a printed version); write for scannability; use links to split up long blocks of text; and avoid subjective and metaphorical language. According to Petroni's analysis, the restyled homepage lost its attractiveness since its meaning potential had been "encaged" in what de Beaugrande and Dressler defines as ordinariness: "Ordinariness supports an easy processing but non-ordinariness renders processing an interesting challenge" (de Beaugrande and Dressler 1981, 141).

content is structured in unexpected patterns, it is highly entropic, scarcely predictable and, hence, highly informative and challenging. Conversely, when a website follows usability conventions, it has low entropy and more predictability since it is well patterned within strict rules. As a consequence, its informativity degree is lower.

Of course this loss is not perceived as such because it is compensated by other gains obtained thanks to the co-deployment of different semiotic resources that, in turn, produce salience. We can state that the high entropy lost in verbal language is remediated, and thus regained, by visual and sound technology thanks to hypermodality that entails the mechanism of blurring and blending semiotic boundaries.

3.3 Framing and Linking

Framing pertains to visual communication but frames are pivotal components of any form of composition (verbal, visual, music, etc.). According to Kress' framework (2010, 149), "at a general semiotic level the word 'frame' names the formal semiotic resources which separate one semiotic entity from its environment or from other semiotic entities… A frame excludes and includes". Each mode has its specific means for framing, e.g. in the writing mode punctuation is a fundamental resource for framing. Framing of various kind is the "punctuation of semiosis". Framing implies both disconnection of elements, e.g. frame-lines, pictorial framing devices, colours, empty space, etc., and the opposite, connection, how elements of composition may be visually connected to each other, through the absence of disconnection devices, similarities of colour, visual forms. When a sign-maker creates a frame, s/he separates the unity of the existing environment by excluding portions of it. At the same time, when creating the frame, s/he needs to re-form a unity inside the frame itself in terms of meaning making. The constant presence of framing allows the composition to be perceived as a fragmented unity. The first frame we perceive as soon as we interact with social media is provided by the medium itself, e.g. by the edges of the screen. It excludes the real space and includes the re-mediated space.

Linking here pertains to hypertextuality. It is broadly recognised that hyperlinks are not simple technical devices but semiotic resources and they are totally embedded in the meaning-making processes of social media. Furthermore, with the web being highly entropic and containing high information density, the massive presence of hyperlinks in any form of digital textuality allows information to be managed, encoded and decoded. A node, or one of its components, is a minimal unit of signification, but it expands its meaning as soon as it is transformed into a link, becoming therefore embedded in a trajectory (Lemke 2002, 2009). Thanks to the constant presence of internal and external hyperlinks, information is encoded in such a way so as to claim

attention through the transgression of any process of predictable decoding. The act of linking is conceptualised as meaning making and what characterises a trajectory is precisely its coherent meaning-making potential in the unpredictable sequencing of different text-types that become longer than the standardised elements strung together along the pathway. Meaning potential of links helps hypertext maintain both its randomness, in terms of attractiveness, and its coherence, in terms of effectiveness and efficacy (Petroni 2011). Hyperlinks realise connections and disconnections between screens. Again, a fragmented unity.

4. Final remarks

Thus, we can conclude that paradoxes are inherent parts of our communicational activities and hence of our societies. Communication gives rise and feeds on diversity, the latter being a result of dialogue. But diversity creates too much communication and this inevitably leads to homogenization of the world and loss of diversity. It is possible to state that the paradox of diversity is prototypical.

Contrasting relations enhance dialectics, and both are at the centre of our understanding and usage of social media (Arnold 2003). Additionally, the paradoxes of technology imply the existence of a multimodal ensemble at the basis of their semiosis since they are based on contradictory relations between systems of signification and rooted in many representations of human interactions. They need moreover to be further explored through a multimodal framework since multimodality, as well as describing semiotic resources, allows us to investigate intersemiotic relations. Likewise, since multimodality is a powerful tool to decode the phenomenological aspects of our society at any level, it needs to pay more attention to antinomies. Diverse facets of meaning are realised differently by each of the modes in the ensemble. Yet, each mode plays only a single role in the performance of the whole meaning. Two modes at times overlap, at other times may be complementary or may be even contradictory, and from this tension paradoxes arise and enhance reflection, critical analysis and evaluation. This is certainly a benefit, in particular when antinomies occur in digital communication.

Social media along with their affordances integrate ideologies and affect the way we think, do things, build up our identities, establish relationships, and make meaning. Their pervasiveness makes them "transparent" and encourages us to forget that they (re-)mediate the Real. Creators of media technologies are aware of the value of media transparency and exploit it, as Apple did when it released and advertised the first iPad by asserting: "Technology is at its best when it feels completely natural, almost like there's no technology at all". What a witty thinker Meno was!

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