Changing Paradigms in Technology and Communication

Executive Summary

The history of human communication can be measured by a series of paradigm shifts: speaking, writing, printing, and now, interconnecting globally.

Government and business need to invest in research and innovation to explore how the communicative context is changing, how individuals will be affected by their interconnection with electronic objects, and what transcendent values will define the collective vision of reality.

1. Historical Landmarks in Communication Techniques

Communication has never been a static ability. From the day our species first learned to speak, communication between humans has provided the basic social glue of our existence, responsible for creating and maintaining cultural coherence. Ever since then, the message exchange process has never ceased to evolve and change: content creators have always had to adapt to existing channels, tools, styles, registers, or ritual processes that humankind has invented along the way. Throughout this evolution, we can identify critical moments when major changes have shifted the entire communications paradigm.

Speaking: survival possibilities and sociocultural development

Speaking is a major revolution that evolves from the initial communicative capacity that, for many species, is physically embedded in individual contact and gestural or behavioral interaction[1]. The development of language skills opens the opportunity to communicate beyond the immediate surroundings: when our species started to speak, we could suddenly identify and explain events that happened in places unknown to the audience, or in the past. We even learned to talk about cause and effect of hypothetical events in the future, and question whether the future even existed.

Spoken language provided a common code, not only for communication, but also for storage of collective knowledge and memory. It also gave us the means to develop mental models to structure how we organize abstract content, both cognitively and linguistically[2].

The user experience

Our ability to speak allowed human beings to enter a period of cultural creation and expansion that vastly enhanced our personal and collective survival capacity. Describing, explaining, negotiating, and expressing explicit intentions offered us the opportunity to collaborate, and to create expanded cultural spheres that gave us tools, conduct rules, art, and commerce, beyond our immediate physical reach[3].

Good orators had the power of convincing, and linear communication (one-to-one; one-to-many) was the basic communicative model that empowered content creators, such as storytellers, politicians, and rhetoricians.

As long as oral flow was the only means for transmitting information, no one could hold all the knowledge of the community in his or her head, so the collective memory was shared across many people. Accumulation of knowledge was a community responsibility. Since life was fragile and unpredictable, different individuals had to be responsible for the same information, to prevent loss of knowledge should anything happen to any one "subject matter expert".

[1] M. Corballis (1999), The gestural origins of language, in American Scientist, 87: 138-145.

[2] Chomsky, Noam (1957), Syntactic Structures, The Hague (Holland)/Paris (France): Mouton

[3] Wagensberg, Jorge (1980), Nosotros y la ciencia, Serie Conjeturas 8, Barcelona (Spain): Bosch ed.

Guttenberg's invention of printing with movable type was a true revolution... Authors could now become creators of opinion, developers of knowledge, and motors of cultural and scientific change. And audiences became consumers of information.

Writing: expansion and cultural continuity

Just as speaking gave us the possibility to conceptualize and communicate about events beyond our immediate space and time, writing revolutionized our common social environment by storing messages and information. This allowed previous human experience to exist further out in time and space than the originator's own existence.

Written documents, from ancient Sumerian tablets to classical scrolls of papyrus or parchment, ensured the continuity of laws, science, or other collective knowledge, as long as people were able to read and understand the language it was written in.

Documentation became a matter of power and cultural survival for states, religions or ideologies[4]. The role of author (content creator) gave literate people enormous influence because they could reproduce and augment written information. In addition, the role of reader allowed them to become mediators, and connectors between different fields of knowledge and different sources of information, for the illiterate majority.

The user experience

Learning to read and write moved the knowledge-storage experience from the collective, oral realm to the realm of more restricted, literate elites. For a long time, the few who could read mediated between author and audience and decided which content was transmitted, when it was delivered, and to whom it was communicated. Possession of a book, as an object, was equivalent to possession of wealth.

In this context, knowing different languages and being able to access written texts in different codes empowered the readers who could enlarge their secret information, thanks to a diversity of sources.

Mass printing and universal reading skills: exponential growth of authors' influence

Guttenberg's invention of printing with movable type was a true revolution. His modest intention to give access to the Bible to everyone had results that far exceeded his own expectations. In truth, Guttenberg provided the key to access any written text. Printing converted the book from a rare object to a mass produced commodity.

The effect was to make written communication as accessible as oral communication had been in the era when speaking was the only medium, as long as the book owner knew how to read. The natural evolution towards generalized literacy led to exponential increases in the replication and distribution of messages. Authors could now become creators of opinion, developers of knowledge, and motors of cultural and scientific change. And audiences became consumers of information.

The user experience

The democratization of written knowledge went another step towards empowering the individual. Knowledge moved from the collective, mediated sphere of controlled dissemination (monasteries, universities) to the individual sphere of personal opinion and reasoning. It was no longer necessary to work collectively to store or to retrieve information. Literacy and the book empowered individuals. The growth of personal literacy also had the effect of enriching social exchange.

Democratic access to written texts, together with historical and political events of the moment, brought about the need for states to create generalized, public education. As people learned more, and created more texts, the expansion of knowledge brought the combination of scientific and industrial revolutions that has changed all our lives forever.

The process of switching from mediated learning to personal acquisition of ideas led to the emergence of humanism. The act of reading was converted from a collective performance to an individual experience. This is true even in a shared reading situation (for example, a class, where all students read the same textbook). Not only that, but each reading of the same text is a unique experience, just as each performance of a theatre piece is unique. Readers, actors, and other mediators of texts thus acquired an important role in developing the communicative act, but did not share authorship with the text's originator.

[4] Weber, Max (1919), Politics as a Vocation, Lecture to the Free Students Union of Munich University. [Full English version available at: http://anthropos-lab.net/wp/wp-content/uploads/2011/12/Weber-Politics-as-a-Vocation.pdf Last access on 20th March 2013]

2. The New Ubiquity

Connected computers and changed roles for authors and audiences

We have gone past the simple need to read or understand the linguistic mechanism of encoding and decoding. We are now focusing on the skills of interacting, negotiating, leading, and somehow seducing the audience.

Writers and readers shared content as a communicative meeting point, but had clearly separated roles until the invention of computers changed the model. Computers are not just another reading and writing surface, nor a more powerful printing tool. In fact, interconnected computers provide instant access to international libraries, they generate delocalized offices and markets, they build medical services, and they offer unexpected spaces for new literary forms, scientific formulation, or artistic creation. They not only capture cultural output to transcend space and time, they also create new spaces in which to develop cultural production.

Indeed, every human communicative occurrence, every event of reality that we can perceive can also be digitally codified. Digitization has transformed texts, images, or performances into a single common code of zeros and ones, in a compound message–invisible to the average user, but essential for converting information into today's virtual flow that connects authors, audiences, and mediators in a complex network of communicative protagonists and events.

The advent of always-on broadband networks attached to computers in our homes has led to two significant phenomena that are the hallmarks of contemporary society: ubiquity and virtualization. Ubiquity gives us the advantage of being everywhere and anywhere whenever we want, anonymously. We can take part in a collective event without revealing our presence.

Virtualization goes beyond this deterritorialization, and results in a dematerialization of human actions. Matter, space, and time all become one stream of bits: interchangeable, transmutable, and intangible.

Moreover, the current upsurge of widespread mobile connectivity is the harbinger of another major communicative paradigm shift. Smartphones and tablets are driving the emergence of a new way of living, in which space and time is still further de-structured. Computers are now integrated into everyday objects in every human activity, enlarging the concept of ubiquity, and they are fully interconnected: transport, furniture, household appliances, clothing, toys, and writing devices are all part of this new internet of things. Obviously, this has significant impact on the nature of content creation and development going forward.

"Literacy" is now a global experience. We have gone past the simple need to read or understand the linguistic mechanism of encoding and decoding. We are now focusing on the skills of interacting, negotiating, leading, and somehow seducing the audience. Responses can be of such intensity that that they might harm the credibility of the message, product, or author, with exponentially spreading consequences.

The user experience

The hypertextual environment has become a "place" to exist, in which readers and writers exchange simultaneous roles. Readers, without mediators, have become the authors of their own experiences, thus becoming co-creators in a web of communication that they elaborate and recreate every time they experience it.

In the marketplace (of ideas or of goods and services), "prosumers"[5] are now the norm: we are both producers and consumers of information. Buyers are no longer passive, but interactive, via their ability to "favorite" or "like" a document, or by collaborating directly with the initial author of a text when adding their comments and experiences under a blog post, for example.

Mobile devices have moved us from multitasking on one device, to a world of multiple, single-tasking channels: we can listen to a face-to-face conference and tweet about it from our smartphone, while recording it on our tablet and chatting with our neighbor about the content. They have changed our gestures from mouse manipulation to the simple combination of swipe, pinch, and tap. Tactile screens are putting us in more sensorial contact with our devices, and tactile feedback will make that contact sensual, as well. Cognitively, this puts us closer to the information; we are able to directly manipulate data on the surface of our devices. We still don't know how this will affect our relationship with content, but we are starting to understand that the mere act of accessing information with our bodies creates a personal inner discourse that will affect our interaction.

[5] Toffler, Alvin (1980), "The Third Wave", New York (US): William Morrow.

3. The Way Ahead

Three lines of research that merit investment

A multiplicity of compound messages is digitally codified by existing communications platforms every day, all over the world - but the result is more of a spontaneous cacophony than a composed symphony.

As we have seen, speaking, writing, printing and digital sharing are evolutionary landmarks in communications technology, but it is difficult to identify what the next stages will be, in this transliterate world. What follows are three areas that merit attention and investigation from thought leaders in academia and business. They are benchmarks of many of the current changes in communications technology at contextual, individual and collective levels:

- **Complexity is on the increase**—Most innovative conceptual opportunities happen when experts invest time in reflecting and exchanging ideas on how context is becoming more complex, and how this is enriching our vision of traditional communication concepts and actors.
- **Individual connectivity is diversifying into human-machine symbiosis**—Our increasingly connected mind-sphere is broadening to include hybrid organic and sensorial body-object interfaces that provide easier personalized interaction.
- **New collective visions are emerging for structuring and understanding reality**—In a world where global media contributes to socialization by defining personalized expectations and success, global participation and networks of people are going to become meaningful by providing analytics, delivering recommendations, and taking action.

Complexity is on the increase

Complexity doesn't mean chaos, but it may seem so, when looking at this new hyper-connected era. Several models are trying to present a coherent representation of this increasing complexity. The idea of "connectivity" has evolved towards more and more complex meta-layers that go well beyond simple physical interconnections. It integrates the physical grid, the network of content, communities of people, and the theoretical interpretation of the holistic structure created by their interaction. Connectivism[6], developed as a learning theory by George Siemens and Stephen Downe, includes, in a single model, the three principal networks involved in communication: the neurobiological structure that mediates our sensorial perception, the conceptual codified background that allows linguistic comprehension to take place, and the sociocultural reality that is generated when communication happens. In the virtual world, these three layers happen simultaneously, and in an extremely combined manner.

A multiplicity of compound messages is digitally codified by existing communications platforms every day, all over the world—but the result is more of a spontaneous cacophony than a composed symphony. The situation recalls an oriental bazar, where oral voices crossed constantly and simultaneously, at different volumes and in different languages. In this ancient form of network node, people exchanged commercial wares, traded information gathered along the caravan routes, and made new contacts for future business. The main differences today are that the directionality of communication is increasingly complex, and that communication is diversifying in unexpected ways, toward unexpected fields of activity.

Increased complexity in directionality of communication is mainly due to vanishing frontiers between roles, making the internet more of a continuous melting flow, as it becomes more and more global:

- Multiple authors and multiple receivers
- Anonymous or identified individuals
- Synchronous and asynchronous interactions
- Real humans or embedded avatars
- People-to-people or human-to-automaton
- Teams and team networks
- Addressing one-to-many and many-to-many at the same time

It all takes place in a continuous content creation process. The most important change in directionality will appear in the internet of things that is generating content far beyond immediate action-reaction

[6] Downes, Stephen (2005), "An Introduction to Connective Knowledge", at Stephen's Web [http://www.downes.ca/post/33034] and published in Hug, Theo (ed.) (2007) Media, Knowledge & Education - Exploring new Spaces, Relations and Dynamics in Digital Media Ecologies. Proceedings of the International Conference held on June 25-26, 2007. Revised and updated in November 27, 2007. [Complete revised text available at: http://www.downes.ca/files/connective_knowledge.doc Last access on 20th March 2013]

What may be seen now as "dependencies," – on smartphones, tablets, music players, etc. – might be recognized as part of "personal expansion" in the future. Will they be seen as rights, or as duties?

mechanical processes. A great universe of information is produced automatically by electronic devices and for electronic devices, stored by machines and sent to automatons to be interpreted, and exchanged directly and exclusively among automatic devices.

Diversification, multichannel communication, and mobile or embedded communicative devices are defining new spaces for exchanging private and public conversations in different layers. Some of these will inevitably be undesirable, and these are expensive to control and difficult to prevent, creating new questions of security, privacy, information tracking, and intellectual property. Enterprises will have to know which of these issues can affect their revenues, and will have to decide how they want to deal with those that are most relevant to them.

We are facing a world of unexpected connections, more abundant, deeper, and from a greater distance than the caravans ever experienced. Plurality of interaction creates new models of dialogue. Different ways of dealing with communication results will emerge on their own: new rules, new markets, and new values. In social structures, people develop their own rules, practices, and traditions. Even with moderators, social networks are largely self-organizing.

Management needs to acknowledge that benefitting from the collective intelligence of a social enterprise also means modifying traditional notions of command and control, and particularly the control of information flow that is vital for business analysis. Social collaboration capabilities should be integrated into the everyday applications people use at work, to allow them to share information in the context of their business processes[7].

To improve decision making, companies will need to concentrate on identifying and empowering the main actors and fostering people's proactivity, more than on document plans and artifacts that provide short-term vision for business action.

Organizations need to invest in facilitating engagement from every participant, not only internally, but also on the outside, through appropriate social media. They can then apply social analytics tools to online conversations, mine social data and gain new insights that they can use to improve business processes.

Individual connectivity is diversifying into human-machine symbiosis

Humans are more tool-dependent than ever, in this virtual, intangible, communicative world. Communications devices are also the means we use to develop our personal and collective identities, in our new hybrid communities. We are conceptualizing our physical and social needs under new paradigms. We are emotionally attached to our communication devices-losing a mobile telephone or crashing a hard disk are already identified as significantly stressful situations in adolescent psychology.

Eventually, human brain and behavior will adapt to the new stimuli we are facing on the net. Two of the most evident examples, acceleration, and amplified human capacity, are both emerging from the tendency to "externalize" processes that we originally performed with our organism: memorizing information, calculating, ordering and organizing knowledge, planning sequences, or moving objects, for example. What may be seen now as "dependencies"—on smartphones, tablets, music players, etc. —might be recognized as part of "personal expansion" in the future. Will they be seen as rights, or as duties?

Biotechnology research for health care is accelerating, opening unimaginable possibilities. It is taking us beyond repairing physiological damage, towards the development of new human potential. Corneal implants, for example, could incorporate holographic displays in a not too distant future. Personal or professional devices might be more comfortable as temporarily inserted, subcutaneous microchips, than as separate objects carried in a pocket. Integrated circuits that allow only certain connections to specific individuals might be delivered daily or weekly as personal tattoos, labels or perishable consumables for personalizing data in localization processes. Will they be institutionally assigned or voluntary choices?

Research into multi-sensorial distance communication is widening the horizon of virtual human interaction. Increased and subtler use of sound, the introduction of teletactility, and even teleolfaction, provide a new cognitive canvas on which to paint our messages. With the opening of these new channels, content industries will be obliged to redefine concepts as basic as what "content" really is, and the entire notion of content "delivery", which promises to become more fluid and less packaged, as it adapts to this new organic continuum of virtual communication.

[7] IBM Institute for Business Value (April 2012), "The Social Business: Advent of a new age". White paper. Somers, NY (US): IBM Software Division. http://public.dhe.ibm.com/common/ssi/ecm/en/epw14008usen/EPW14008USEN.PDF

The hybrid Internet of people and things also means there will be more devices that need to be synchronized, to link both flesh and electronics in a single continuum, and to maintain our personal and professional efficiency.

Communicating devices are already embedded in the environment (ATMs, mobile devices, automobile parking aids, domotic devices, remote controls, etc.). The ubiquity of internet goes together with ever-increasing levels of human connectivity, not only with other humans, but with objects and mechanisms that may include a combination of inorganic and organic tissue—so-called "wet systems." The internet of things will include everything from banal intelligent devices in everyday objects such as clothing or cutlery, through to sophisticated implants and neuronal plug-ins. This hybrid relationship will open a new world of communications landmarks. What uses, needs and opinions will they generate among individuals, among communities, among corporations and states?

In the same way that today, we choose a make, model and color of our smartphone to suit personal taste, tomorrow we will customize our connectivity with people, objects, and environments in an undistinguished continuum. Prostheses, implants, tattooed circuits, telesensors of all sorts, will contribute to how we define our own identities. These devices will accommodate medical needs, personal preference, professional convenience, or parental decision-making. They will define a future human-machine neuronal marketplace, in which the clients will be as much the devices as the people attached to them.

Today´s interactivity is a complex mix in which it is often difficult or impossible to distinguish whether we are communicating with another person or an automaton. Furthermore, it is seldom important as long as we accomplish our objective (automated supermarket checkouts have replaced interaction with a human cashier). The merged human and object internet is not only about knowing, via the screen, how much milk is in the fridge or how many trousers are in the closet, but about obtaining a direct suggestion for the most appropriate menu in a specific situation or the best outfit for today´s weather and meeting schedule. The primary demand is no longer the initial request for information, but the urgent need for complex problem solving and decision support. Traffic control, personal outfit and diet, matching partners, parenting support, personal schooling… What complex demands are going to be asked of personal and professional devices? How will this growing accumulation of complex information, these learning objects or simply these chunks of knowledge be presented in personal spaces, so as to be truly mutable, resizable, individually targeted, personalized, and represented?

The hybrid internet of people and things also means there will be more devices that need to be synchronized, to link both flesh and electronics in a single continuum, and to maintain our personal and professional efficiency. Standardized synchronization protocols become essential, and walled gardens will be a luxury no company can continue to afford. Open source protocols that enable external participation are likely to become ever more attractive. This inclusive participation, however convenient it may be, could eventually be perceived as a threat by corporations, states, or individuals. How will institutions react, what follow-up mechanisms will they put in place?

As complexity increases, different cultural spaces will appear, defined by a series of superposed layers of physical, social and ideological structures. In these new spaces, we will construct new meanings and contexts for the cultural interpretation of reality.

New collective visions are emerging for structuring and understanding reality

We are unable to know, at this time, how concepts of reality will evolve. Not long ago, Albert Jacquard[8] proposed the concept of degrowth to restructure the consumer society, and identified three main social characteristics of modern society:

- Amplified mediatization of everyday life (context)—i.e. even banal events end up in one or another sort of media.
- Eternal youth as principal vector of personal behavior (value)—i.e. ageing is a taboo.
- Contingent action targeted to superficial problem solving (aims)—i.e. we tend to constantly shift focus to the first thing that calls our attention, rather than prioritizing.

Gamification, the use of game thinking and game mechanics in a non-game context in order to engage users and solve problems[9], would seem to be a natural evolution of social development in this context.

[8] Jacquard, Albert (2006), "Mon Utopia", France; Stock. [Also, Wikipedia biography available at: http://en.wikipedia.org/wiki/Albert_Jacquard Last seen on 15th March 2013]

[9] Gamification, "the use of game thinking and game mechanics in a non-game context in order to engage users and solve problems", according to Zichermann, Gabe & Cunningham, Christopher (August 2011) [Also, Wikipedia definition, available at: http://en.wikipedia.org/wiki/Gamification Last seen on 15th March 2013]

Ironically enough, in a world of virtual connectivity, the best investment might be to promote and facilitate face-to-face events and gatherings.

Taken together, Jacquard's three characteristics explain the juvenile ethos of present-day society and he suggests that the situation calls for a new collective vision of society, built on responsibility and sustainability. He even goes on to declare that a significant social mutation is already in progress, and heading in that direction.

The truth is that the world has recently been involved in a deep consciousness-raising process encouraged by, among others, Stéphane Hessel[10]. His essay, "Indignez-vous!" has had echoes throughout the world. Transcendence and authenticity are growing values. Society seems to be demanding socially transformative values in politics, economics, and ecology as well as in industry, education, or technological development. The inability of leaders to integrate these demands into the structures of society is a clear indicator of their avant-garde, revolutionary nature.

Are we moving towards a world where values are more unified, or more diversified? Bauman's concepts of "Liquid life" and "Liquid society"[11] represent a useful metaphor to describe this particular moment: boundaries are blurring and disappearing, and concepts are merging and blending to create new paradigms, and not only in communication.

On one hand, convergence seems to be a coherent path. The so-called "Nano-Bio-Info-Cogno innovation", the global ecosystem that includes future trends in technology, globalization, trade, health care, population, science, climate, workforce and security, promoted by James Canton[12] among others, provides new shared conceptual models of reality. They are founded not only on connectivist structures of knowledge, but also on new "collective imaginaries"[13], the sets of mental representations composed of symbols and narratives that we use to represent our community, and that finally frame our common perceptions, motivations and actions.

On the other hand, globalization makes local values somehow attractive and deeply connected to identity matters. Communication becomes more complex when using different languages, with different cultural interpretations, and transcreated content, blending them in a new multi-literate discourse. Recognition of diversity is becoming a value in itself, and it is establishing new marketing strategies. Localization is already the main stream, personalization is increasingly in demand, and disconnection from majorities will be a luxury.

The role of content workers in this new world will evolve from being gatekeepers of content production technology, and redactors of the wisdom of Subject Matter Experts, to that of curators of social content, where "social" means from any source who considers him- or herself to be a stakeholder (including customers, journalists, hobbyists, as well as developers, marketers and product managers). Content workers will also become analysts, online moderators, and content strategists, who make essential contributions to a unified content strategy that includes all enterprise-wide communication: internet, marketing, advertising, user assistance, social network presence, and all content embedded in the product itself. Tools no longer matter. For example, localization tools that facilitate commercial opportunities in multicultural environments are moving plurilingualism, translation, and translanguaging from the human realm to mechanical processes.

In a world where everybody has the tools for creation, publication, discovery, acquisition, access, use, and re-use of any informational object[14], the leaders and opinion-makers will be those who are able to invest tomorrow's economy, education, politics or communication with sense, purpose and meaning. To ferment and promote the best ideas, more multidisciplinary debates among intercultural groups of thought leaders need to be organized (following the TED model, for example); the meeting, confrontation, and merging of ideas from different fields and experiences is the most fertile ground for obtaining fresh results. Ironically enough, in a world of virtual connectivity, the best investment might be to promote and facilitate face-to-face events and gatherings.

[10] Hessel, Stéphane Frédéric (2010), "Indignez-vous!", Indigène, Montpellier, ISBN 978-2-911939-76-1 (French). Published in English as "Time for Outrage!" by Charles Glass Books, London, 2011, ISBN 0704372223 [Also, Wikipedia biography of Stéphane Hessel available at http://en.wikipedia.org/wiki/St%C3%A9phane_Hessel Last seen on 15th March 2013]

[11] Bauman, Zygmunt (2006), Liquid Times: Living in an Age of Uncertainty, Cambridge (UK): Polity.

[12] NBIC Convergent Technologies and the Innovation Economy: Challenges and Opportunities for the 21st Century, published in Managing Nano-Bio-Info-Cogno Innovations: Converging Technologies in Society, Springer, 2006

[13] Hall, Peter A. & Lamont, Michèle (2009), "Successful Societies. How Institutions and culture affect health", Edited by Peter A. Hall and Michèle Lamont. New York (US): Cambridge University Press. Page 12, " Introduction".

[14] Tabuenca, Bernardo et al. "OER in the Mobile Era: Content Repositories" Features for Mobile Devices and Future Trends", [Full document available at: http://dspace.ou.nl/bitstream/1820/4656/1/eLearningPapers_btabuenca.pdf / http://hdl.handle.net/1820/4656 Last seen on 15th March 2013]

Conclusion

Every single scientific discipline is getting involved in virtualization, and starting to provide resources for innovation in the content industries: statistics and sociology are already essential in user analytics, psychology and pedagogy will play increasingly important roles in content creation and thought leadership, microbiology and crystallography are going to be significant for faster connectivity, physics and chemistry are opening promising areas of nano-technological research that will bring unexpected solutions for increased transformation and processing capacities, in the near future.

In daily life, people change roles constantly, as a function of context, audience, or needed communication style, in a continuum of actions, profiles and mixed capabilities. Experiential learning is messy and not always focused. People draw on a multiplicity of sources that are not always coherent. They flip from instant, linear conversational information to non-linear, structured data, mashed together from different fields and many alternative paths. They access knowledge as a personal discovery, a formal recollection, or an informal chance, but it is always an enlightening process that affects emotions, especially when this process is shared with another human being.

The amplified communication that takes place in the collective spaces of the net is so charged with emotional involvement that authenticity is more necessary than ever, and nothing can be simply imposed. Negotiation skills, engagement, expert thinking, leadership, and community-building skills are in great demand. Mobilizing this enormous human resource generates new careers and business opportunities, and is one of the most important investments for the future.

Author Biographies

Ray Gallon is owner of Culturecom, a consultancy specializing in technical information design, content strategy, and usability. He has over 20 years' experience in the technical content industry, having worked with major companies such as IBM, Alcatel, and General Electric Health Care. Previously, Ray was an award-winning radio producer and journalist, and has worked with with broadcasters such as CBC (Canada), NPR (United States), France Culture, Radio Netherlands International, Deutsche Welle, WDR (Cologne, Germany). In the late 80s, Ray was program manager of WNYC-FM, New York Public Radio.

Ray is a member of the international board of directors of the Society for Technical Communication (STC) and past president of STC France. He is a two-time winner of awards in the trans-European technical communication competition, including Best in Show. He is a frequent speaker on communications topics at conferences and seminars around the world, and has taught communications subjects at New York University, The New School (New York City), Université de Toulouse Le Mirail (France), Université Paul Valéry (Montpellier, France) and Université de Paris Diderot. He is currently a researcher at The Transformation Society.

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Neus is an author and co-author of educational material and textbooks for Oxford University Press, Richmond-Santillana, Oceano, and McGraw Hill. Her areas of expertise include communication, language learning, digital learning, ICT, organizational networking, educational assessment, international collaboration, and headmaster coaching. She is currently doing research with the Jaume Bofill Foundation, the OECD, several Catalan universities, and The Transformation Society.

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