

ICT study implications for human interaction and culture : intro to a special issue

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**ICT Study implications for human interaction and culture: Intro to a
special issue**

J. Ulijn, D. Vogels & T. Bemelmans

Eindhoven Centre for Innovation Studies, The Netherlands

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Technische Universiteit Eindhoven, The Netherlands

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ICT Study implications for human interaction and culture: Intro to a special issue

by Jan Ulijn, Doug Vogel and Theo Bemelmans

The last 30 years of digital revolution has had a growing impact on how people communicate through an expanding set of new media. This process has been largely a matter of technology push, where gadgets loving nations, such as the US would take the lead in just trying out for human communication what is technically possible and available. Do all those new media really increase the quality of human communication? Is the fact that some national cultures (NCs) are more conservative in introducing the latest Information and Communication Technology (ICT) innovations a sign of "lagging behind" in the new economy? Or: Might this economic development be not such a blessing for global human communication and is it just more prudent to implement only those ICT inventions into innovative products that really foster the quality of the global human interaction accounting for NC differences? How do we explain culturally and communicatively the behavior of a young person who prefers to use her mobile phone walking in a busy street, instead of taking the opportunity to communicate face to face right on the spot in the "old-fashioned way"? If this happens in Beijing, would it mean that the person would like to avoid the shackles of the collectivism and social control of the Chinese culture and is this in Western individualistic societies just an expression of personal freedom? What should we think about the quality of human interaction of a nerd who is almost part of his PC and runs into miscommunications of an emotional nature because he hates to use even to use any phone or talk face to face. Needless to say, answers to those questions might make it possible to get away from Technology Push in the ICT-arena. Such answers would tell us how users utilize the new communication media and which ICT-products a global market still full of different cultures might really need: A matter of Market Pull?

This special issue cannot have the ambition to give a satisfactory answer to all such questions. It can, however, present some ICT studies to address the issues of relevance for human interaction and cultural fit. In doing so, we selected one ICT-study assessing the impact on interaction between national cultures (Hong Kong, French, Dutch, Rutkowski et al.). Two other studies deal with cultural fit or the lack of it in communicating through the new media between the professions, such as different fields of engineering (Delinchant et al.) within France and between the branch/corporate cultures of supplier and customer (Van Luxemburg and Ulijn) mainly within the Netherlands. The first study is related to E-collaboration through education and the latter two to cooperative design as a major step from invention to implementation of an innovation. Another selection relates to the issue of the new economy. What can we learn from the wealth of recent economic statistical country studies in the ICT area for the future? We invited the authors of such studies of countries of different NCs, such as Ireland, India, Malaysia and Brazil to reflect on aspects of human interaction and culture to achieve the above technology push-market pull transition. What will be the added value of ICT to the classic rich media? For example, Aziz deals with interaction of ethnic cultures within one country (Malaysia).

In sum, this issue claims to innovate in two directions: it emphasized more professional and branch culture aspects than classic national and corporate culture studies (NC and CC) do to assess the impact of the new media on communication between those cultures than has been done to date in the literature (see below). Moreover, it links economic ICT studies to those issues, which has never been done, to our knowledge (see Rifkin, 2002 as one of the rare attempts to relate economy to culture for a better intercultural dialogue in the world).

This is a special issue of one of the IEEE journals specializing in professional communication, how does it follow up what has been published earlier in journals of that kind with respect to the effect of the new media on human communication and culture? The interest for such issues is growing with special issues of the *IEEE Transactions on Professional Communication*: 1999, 42(4) on *Communication in Virtual Organizations* edited by El-Shinnawy with contributions by Burn and Barnett, Harrington and Ruppel, Scott and Timmerman, Johansson et al.; 2000, 43(1) on *Communication in cross-functional teams* edited by Smart and Barnum which is also a special issue of *Technical Communication*, 47(1) with contributions by McGee, Robey et al., Bernhardt and McCulley and Morton, and 2001, 44(1) on *Communication as a social construct within an information society* edited by Campbell with contributions by Te'eni et al. and Ruppel and Harrington; 2001, 44(2) on *Technical innovation and Global Business Communication* edited by Ulijn and Campbell with contributions by Zahedi et., Vogel et al., and Ulijn et al.. Most of those, including the one edited by Price (2001) on *Modeling information in electronic space* (special issue of *Technical Communication*, 48(1)) focus rather on the technical aspects of ICT, some are more concerned with the impact on human communication, but studies reporting on cultural implications are rare (see in particular Burn and Barnett, Ruppel and Harrington and some contributions to Ulijn and Campbell).

Other IEEE journals are even more computer science oriented in dealing with ICT studies: *Transactions on Computers, Knowledge and Database Engineering, Pattern Analysis and Machine Intelligence, Parallel and Distributed Systems, Software Engineering, and Visualization and Computer Graphics*. Other Communication Journals pay an increasing attention to writing documentation for ICT-products, such as: *Journal of Business and Technical Communication, Journal of Technical Writing and Communication, Technical Communication, and Technical Communication Quarterly*. Hence the current special issue fills the gap somewhat between the overwhelming offer of technical studies of ICT and the ones on human communication and culture. On the other hand there are the economical aspects of ICT which are relevant to a journal, as *The IEEE Transactions on Engineering Management*. Here we will stress this global new economy somewhat by looking at specific countries. After some definitions of important concepts (1), we will link up with professional communication and innovation management (2) as a base for our first 3 studies related to the interaction between cultures and professions via the new media and give some economic underpinning to the last ICT study (3). In sum, a comparison on several aspects between the studies is made (4) and some conclusions are presented (5). Geography is naturally linked to NC by going from East/South to North/West through Oriental, Latin, and Anglo-Germanic cultures in Hong Kong, France, and the

Netherlands and from North/West to East/South dealing with Anglo-Germanic/Celtic-Asian cultures.

1. Definitions

As one can see above, ICT-studies track a broad range. Communicative aspects will be preferred here over information and technology ones, but a wider perspective is taken by looking at interaction between human beings and not between computers or man-machine interaction. The concept of interaction would involve also cooperation, such as in design with the customer (Van Luxemburg and Ulijn, this issue) and implications of ICT for teaching (See Rutkowski et al., this issue).

This is not the place to give specific definitions of culture, for which this special issue adopts a multilevel analysis, not only from the viewpoint of national, corporate, but also professional cultures (NC/CC/PC, see outline by Ulijn and Weggeman, 2001). Ulijn, Nagel, and Tan (2001) pinpoint PC, as a rather overlooked area of culture study so far. As a result of ICT implementation in human interaction even a virtual culture develops (Burn and Barnett, 1999). Human interaction between cultures implies the concept of intercultural for which we refer to the definition by Ulijn and Li (1995). It definitely should not be confused with cross-cultural which might mean in the context of the 4 country studies that the 4 NCs are compared as monocultural entities. Finally, intercultural alludes to interaction between professions, as well, from which specific professional communication might ensue, as suggested by van Luxemburg and Ulijn in this issue.

2. Link with Professional Communication and Innovation Management.

Technical communication is primarily considered as any professional communication, not only communicating about technology, but also within any other professional field, such as medical, legal and "purely" business, if the latter exists. It also was traditionally rather a part of operations management, that means once the innovative product or service was ready, user documentation was still needed more or less after sales. This is no longer the case. Technical communicators are typically members of contemporary product development teams and it seems unthinkable to design a successful ICT-product ignoring completely the human communication and even the (national) culture of the customer from the outset (See Ulijn, 1996). Ulijn et al. (2000) argue that international business communicators may even play an important role in the boardroom of international holdings to formulate and implement a corporate strategy for innovation in the appropriate intercultural context. International technical and business communicators would have as a mission not only to manage operations, but also innovations in a company.

What is now a state of the art to depart from in this special issue? El-Shinnawy 's (1999) special issue of communication in virtual organizations nicely backs up a couple of notions which are crucial in effective ICT use across cultural borders of any kind: virtual culture as a subset of E-business, which is a subset of E-market with their respective cultures and network and alliance models (Burn and Barnett). Harrington and Ruppel provide evidence in the same issue that trust and hierarchy culture are less of an issue in

telecommuting of IT professionals in 900 US organizations. Group and rational aspects of their CC matter! Scott and Timmerman report for 86 teleworkers in a wide range of US organizations that basic telephone and the voice mail are most frequently used before E-mail and the Internet in the interaction with supervisors, co-workers, top management and customers. The communication characteristics of virtual teams involved in international consulting for customer support that trust here plays an important role, as well as a culture of information sharing, team-based rewards and employee development (Suchan and Hayzak, 2001).

In international educational contexts, such as Swedish and Finnish, students involved in distributed software engineering collaboration, language problems are rooted in the different NCs. The English word problem corresponds to two different words in Finish, meaning just "a task to be solved" or "trouble". So the Nordic reluctance of conflicts would need a careful use of English as the vernacular in such ICT use (Johansson et al. in El-Shinnawy). A social constructivist approach to computer-mediated instruction triggers substantive feedback between learners (Pear and Crone-Todd, 2002) and the this need for social construction leads to compensatory adaptation to a lean medium, for instance to avoid a negative impact on the success and outcome quality of process improvement groups, essential for effective innovation management (Kock, 2001). Computer-Mediated Communication (CMC) can never replace totally normal media richness, such as face-to-face (FTF).

E-mail might be good enough in a combination of CMC and FTF, more CMC in routine operations management, as described by St. Amant (2001) for the 24 hours software development around the globe. This process can be strongly supported by standardization and normalization (See the German DIN study on the *Economic Benefits of Standardization*) in the innovation implementation. Innovation Management, such as in the supply chain between R&D and Manufacturer would require more media richness as Ulijn et al. (in press) reveal.

The limitative selection of our special issue imposes some constraints. ICT study might also imply the following links, since professional communication would also include:

- *Negotiation*, see special of the effect on the new media on that process, including Negotiation and Group Support Systems (NSS and GSS, see more specifically on those tools: special issue of Ulijn and Kersten of *International Negotiation*). Koeszegi et al. in this source, for instance, show clear intercultural aspects of a NC nature, whereas Vogel et al. (2001) and Rutkowski et al. in this issue show effects of Professional Culture differences in GSS.

- *International web design* with its intercultural implications (Zahedi et al., 2001) is absent from our selection.

- *Visual communication*. Since humankind's ability to understand images is millions year older than its speech, E-mail "talk" will never replace visuals: one image is more than 1000 words, but one word says also more than 1000 images. Technical illustrations will always be needed to visualize technical innovations (See Stephens, 1998 and Ulijn in Dekker, 2001). According to the Dutch "Social Plan Bureau" Dutch have been using

less and less printed media and radio as a source of information and prefer images to words by watching more television and using the Internet the last 25 years. It is even a (new) medium of (pre-)negotiation between politicians through television journalists (Botes, in Ulijn and Kersten). Our special issue will not deal with the still growing impact of images in ICT combined with television.

- *Hypertext*. The Internet media are more and more developing their own culture. What Nielsen (1990) predicted is now fact. Hypertext has materialized in applications or web-based information systems, such as Windows Help (Lowe and Hall, 1999). It might simulate how the brain works (?). Design for interaction between computer systems and for the human interface is another aspect of ICT-study (Rogers et al., 2002), which we ignore in this special issue.

All those developments, apart from what our special issue presents, indicate that the users are showing their needs. This holds true not only for the North and the West of the globe. ICT is no longer a matter of Technology Push from the North and the West of this planet, but that other parts, through a kind of Market Pull, will be of increasing importance for future studies of ICT and their consequences for human communication and culture. For example, Asian countries are potentially huge markets for western communications products but only if local cultural (are political) issues are taken into consideration. We are seeing the emergence of cooperative ventures in many countries that are aimed at creating synergy as indicated in projects such as the Multimedia Super Corridor (MSC) created by the Government of Malaysia (see Aziz, this issue)

3. Economical Statistical Country Studies

The relation between economy and culture is sometimes ambiguous and troublesome. A recent study as the one by Du Gay and Pryke (2002) hardly reflects any cultural theory and offers a poor analysis from this perspective. The thoughts of Rifkin (2002), president of the Foundation on Economic Trends in Washington, DC (US) are encouraging. No civil society would ever create commercial relations and then establish a culture. Commerce and government are secondary, not primary institutions. There is an economy of the cultural sector, but economics is just a derivative of culture, not the progenitor of it. The events of Sept, 11, 2001 manifest that a cultural revival might lead to both a positive development of more cultural diversity and mutual respect, which is fruitful for innovation, and to avoid a negative trend of fundamentalism, ultra-nationalism and xenophobia with ethnic cleansing movements pretending religion as an excuse. ICT might serve here as a primordial tool to bring people together in a positive way. What can we learn from different economical statistical country studies in this sector?

ICT studies are not only often a reflection on innovation management, but result also from innovation policy from government bodies on different levels. Which country, region or supranational entity, such as the UN or the EU does not foster ICT development and implementation, because it would create new high quality jobs? Moreover, the same government is not only out there to regulate and sometimes frustrate free ICT enterprise, but it acts also as a customer of the products and services of the ICT suppliers. The thousands of new multimedia products and services: from

computer to computer and business to business to customer-centric business systems, such as E-speak using existing E-service infrastructures (Meersman et al., 1999) affect strongly national, regional and local economies. Apart from the question of the previous section, if those products root solidly in the needs of effective human communication, a comparison between national, regional and local levels of the new economy triggers NC effects as well: Is one country doing better than another and why?

It comes as no surprise that supranational government bodies, such as the EU keep a keen eye on ICT-developments through directorate generals of Telecommunications and Enterprise and Innovation. Their European Innovation Scoreboard (www.cordis.lu/innovation-smes/scoreboard) indicates still a better innovation climate for the US and Japan, based upon investment level, number of Internet connections, and patents, but the share of the ICT market in the gross national products is only 6% in the EU, 5.9% in the US and 4.3% in Japan. Dalum et al. (1999) give a very balanced review of this global EU ICT performance by looking at multi-user systems, data communications equipment, PCs and work stations, software and services both across 14 EU member states and in the US, Canada and Japan, also for mobile communication.

There is an economy of Information Technology and the Media, for which Low (2000) demonstrates that it is not only sensitive to general economic principle of efficiency and competition, but also to some specific cultural contexts, such as the in Asia-Pacific region. Governments propose National Systems of Innovation (NSIs) as a whole on the basis of the work by Freeman, 1987, Lundvall (1992) and Nelson (1983) who define this concept, including the role of techno-entrepreneur. Their actors are not only governments and entrepreneurs, but also R&D departments, Technological institutes, universities and their networks. Those NSIs are increasingly ICT driven also in the Far East. Hong Kong, Singapore, and Malaysia (see this issue) are examples. The latter is a perfect case of a melting pot of ethnic cultures within a NC. Is this development comparable with a EU replacing NCs a supranational European culture? López-Martinez and Piccaluga (2000) analyze the Knowledge Flows in National Systems of Innovation between sociotechnical constituencies in Europe and Latin America, another source for intercultural comparison including the ICT sectors (see for a Brazilian ICT case this issue). Apart from the NC effects on the economy of the ICT sector, dealt with so far, the multimedia themselves also the carriers of cultural content in a broad sense. In his study of European entrepreneurial competition and industrial location Peneder (2001) illustrates the effect of competitiveness policy in this context by presenting a nice model incorporating relevant components of supply and demand including the ICT aspects and media ranging from museums and theater to books, radio and television, including the virtual!

All this shows that the relation between culture and (ICT) economics is intricate and complex and not easy to cover. This issue cannot intend to do so, but there is a global itinerary in ICT economics and culture to track down of which this special issue presents an example in the case of the Multimedia Super Corridor created by the Government of Malaysia. Many countries worldwide are seeking to develop technology parks and other inducements to help create synergism between local entrepreneurs in small and medium sized organizations and large multi-national organizations. The objective is not only to benefit from those associations through job creation and slowing

“brain drain” to other countries but to also attain recognition of local products and services in more global contexts. For global organizations, the reward is increased product penetration benefiting from culturally sensitized development as well removal of government imposed trade barriers and other sanctions. It remains to be seen how successful these efforts are and to what extent such innovations become self- sustaining. Replication of “Silicon Valley” successes may or may not be possible or sensible in consideration of broad-based cultural differences. New models of “virtual silicon networks” may emerge as local and global circumstances dictate and opportunities arise. Time will tell.

4. The contents of this special issue

The 4 papers in this special issue address a range of topics examining ICT study implications for human interaction and culture.

- “E-Collaboration: The Reality of Virtuality” by Rutkowski et al. focuses on the communicative dimensions of global virtual teams placing special emphasis on the importance to structure activities in balancing electronic communication during synchronous and asynchronous e-collaboration (i.e., video-conference, e-mail, chat session, distributed use of group support system) to bridge cultural and stereotypical gaps, to increase profitable role repartition between the participants, and to prevent and solve conflicts. The authors report on four year of research involving hundreds of participants from different national cultures working together for six weeks on a specific project. Experiences are presented and conclusions drawn giving special attention to the process and structure of ICT required to support efficient virtual teaming in education and industry.
- “Cooperative Design among Mechanical and Electrical Engineers over the Internet: some Implications for Tools supporting Human Communication Between Various Professional Cultures” by Delinchant et al. provides an intriguing look into professional cross-cultural cooperative design using an electromechanical plunger as an example. Limitations of existing CAD/CAM and supporting technologies in the context of collaborative synchronous and asynchronous communication needs are exposed. Improvements in methodology are proposed and features for new communication tools are suggested to address media richness deficiencies for various types of meetings. Data were gathered and used to gauge methodology and technology effectiveness in cooperative design activities to validate suggestions. New collaborative tools are proposed to address shortcomings of commercially available support.
- “The Contribution of Electronic Communication Media to the Design Process: Communicative and Cultural Implications by van Luxemburg et al. explores the impact of ICT on cooperative design activities between a company and its customers during the early stages of research and development noted as a key aspect of innovation. The paper is especially noteworthy in its examination of insitu interactions in case studies in established organizations. Aspects of national and professional culture are integrated into discussion and

considerations. Hypotheses are qualitatively tested based upon described communication activities. Analysis demonstrates that electronic communication media can play an important role in technological innovation through supported interaction between the suppliers and customers. Features and functionality of collaborative product development tools to support interactivity moderated by cultural variations are suggested.

- “ICT Clusters as a Way to Materialize a National System of Innovation: a Case on the Communication Aspects in Malaysia’s Multimedia Super Corridor Cluster” by Omar et al. highlights the linkages developed for communication among the various components of a national system of innovation (NSI) manifested in the Multimedia Super Corridor (MSC) Cluster created by the Government of Malaysia. It demonstrates how a set of resources can be synergistically integrated through government and business cooperation as illustrated by adjacency of technology parks and universities with multinational corporations playing a major funding role. The paper recognizes flagship applications that are salient thrusts into the concept domain while retaining local social and economic values. Special recognition is given to the Flagship Coordination Unit as critical success factor. Aspects of electronic government pilot projects are presented.

What does the selection of 4 articles add to the scope and the state of the art and the scope of this special issue outlined above? We will try to answer this question by reviewing our selection on the basis of the nature of ICT dealt with (which CMC?), its relation with human communication and culture, not only at national, but also corporate and professional levels, to what extent are statements or hypotheses supported by empirical evidence and how would the authors see the future. This is not to say that all the above elements were equally represented throughout the 4 articles. Our authors are a mix of engineers, computer scientists, psychologists, communication and educational experts and last, but not least economists, very interdisciplinary indeed. The negotiation by the guest editors with them seduced them to speculate on aspects of their topics, such as human communication and culture aspects, which are not their prime business. In sum, we can say that this is one of first attempts to examine economical-statistical country ICT studies on their possible human communication and culture implications.

4.1 Interaction studies between professions and cultures via the new media

Two of our articles bring the educational aspects about of ICT use in an intercultural perspective. Robey et al. (2000) conclude from a study in a Southern and Northern US town cross-functional virtual teams (between vendors and buyers) offer a lot of situated learning in the same geographical area and time zone, but once they realize that technology does not constrain them they develop communication practices that operate across time and space. In a more formalized educational setting studies as the ones by Wallace and Wallace (2001) and Yang and Alty, 2002 electronic office hours become a component of distance learning and a distributed simulator is developed for control experiments through the Internet to learn to operate the different parts of an industrial process. The article by Rutkowski et al. turns virtuality into reality as a major innovation in education between engineering and business students in 3 countries.

Delinchant et al. also brings students together as actors in an innovation management process: mechanical and electro-technical engineers who co-design an electromechanical plunger hold. Their focus is more on the cooperation between the different actors in a supply chain at the upstream level of R&D. R&D has grown a lot in recent years as a serious partner in supply chain management as a whole. Innovation ideas are not just "thrown over the wall", but related to a very downstream function, such as marketing. Jin (2001) studies the mutual learning process between marketing and R&D in the context of 171 different ICT-products and concludes that role flexibility is needed: one has to look over each other's boundaries of professional expertise and even expeditiously remove separating walls. The Van Luxemburg et al. study in this special issue brings even the customer as an actor in the co-design process with the supplier. The difference between up and down stream then tends to disappear: corporate and professional cultures are melting together into a new virtual culture, as was suggested above. Both Delinchant et al. and Van Luxemburg et al. studies indicate that the sociotechnical approaches, such as the actor model by Hakansson and the psychological profile of the actors involved (see also Rutkowski et al.) are helpful to disentangle their professional communication and cultures before they disappear in one virtual pot.

4.2 Interaction studies between national cultures from an ICT-economical point of view

To examine the relevance of ICT through economic statistical country studies for the development of human communication in the appropriate cultural setting, national, professional and corporate is considerably more complicated. Basically those studies are focused more on political measures of national governments to develop something like a new or an ICT-economy. How can this be done, however, without looking at the communicative and cultural needs of the customers and technical communicators who are in charge of co-developing ICT-products? The articles presented in this special issue allow a comparison of national cultures going from North/West to East/South. What are the cultural reasons for such an orientation and how can technical communicators help in serving both the national and the global ICT-market? Ulijn and Kumar (2000) made some suggestions for an efficient technical communication between India and the West in general, based for instance on the US-Indian Enron case.

ICT supports human communication between partners in strategic alliances to mention just another application. Grotenhuis (2000) found in two cases of Dutch-American mergers several instances of miscommunication over E-mail due to linguistic and cultural differences and problems to successfully integrate Internet and videoconferencing opportunities. Not only in West-East interactions, but also between related language-culture pairs, such as American and Dutch the different way of organizing text and the lack of non-verbal contact might influence managerial communication in a more explicit way in CMC use. The information society supported by ICT-products also has political implications in line with the thoughts by Rifkin (2002). A recent EU-study about the Benefits of Information Society Applications to Citizens makes an interesting account of a EU-Latin America co-operation (<http://europa.eu.int/rapid/start/cqi/guestfr.ksh>). Country studies, such as the one

presented here should lead to more communicative analyses to see the relevance of ICT both for the customer and the citizen.

5. Conclusions

The challenge of this special issue was to link economics to communication and culture around ICT in a broader general context. Were we successful? It is obvious that international technical and business communicators would have as a mission not only to manage operations, but also innovations in a company. ICT can play not only a routine role in operations management (OM), but also a strategic one in innovation management (IM), paralleled with solid face-to-face interaction, as for instance in design cooperation with the customer.

Whereas CMC tools, such as E-mail might be good enough for OM (strongly supported by standardization and normalization in the innovation implementation), IM, such as in the supply chain between R&D and Manufacturer, would require more media richness. Other projects and their characteristics might well benefit from a mix of tools with some tool (or tools) more important at one phase than another. Ultimately it becomes useful to consider a portfolio of tools with a sound understanding of the impact and implications of use of different tools (individually and in concert) as a function of the activity or task and experience of people being supported. By nature this has cultural connotations. It also requires considerable flexibility. What is deemed useful in one context may not be so in another as a function of circumstance. Further, any given tool or tools can be used in different fashions by changing work patterns and interaction structures.

From an intercultural point of view, the interaction between professions would lead to a specific professional communication, for instance in the growing building, medical, or bio process technology sectors. On the level of national culture this issue might give us going from East/South to North/West and back the opportunity to conclude that ICT is no longer a matter of Technology Push from the North and the West of this planet, but that other parts through a kind of Market Pull will be of increasing importance for future studies of ICT. Customers and citizens are both consumers of an Information Society who will pull the ICT-suppliers, because their products have serious consequences for human communication and culture. May the studies presented here lead to more communicative analyses to make ICT more beneficial both for the customer and the citizen.

Finally, we have entered into an age in which no nation is an island. Webs of communication technologies and experience in their use create a network of nations and organizations, some of which have no natural boundaries. National and professional cultures increasingly interact in global contexts as organizations seek to achieve cultural synergy and benefit from opportunities presented. Governments continue to fuel experiments in extended interaction as well as create policy and regulate ICT use. International standards bodies and more general cooperation and interoperability among vendors (at least at some levels) continue to encourage interaction expansion. Economic impacts are pervasive. All of this suggests that ICT implications for human interaction and culture, the topic of focus in this special issue, will continue to be salient for many

years to come.

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