ASSESSING THE SOCIAL IMPACT OF RICH AND MOBILE MEDIA

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Abstract: We are sketching here a research to investigate and assess the social impact of rich and mobile media (video, media spaces, virtual, mixed, augmented reality, mobile, etc.). The objective is to explore the way rich and mobile media are socially shaped in domestic settings, effects on co-proximate and remote forms of collaboration in work environments, transformations of behaviour in public spaces and issues of citizenship and participation. This research should be achieved by ethnographic fieldwork, cross-national surveys of access and use and small-scale experiments of technological interventions/evaluations. In this way, one should expect to highlight the impact of rich and mobile media on interaction and collaboration and to formulate policy recommendations for best-practices to deploy and improve these media.

The objectives of the research

New information and communication technologies are becoming a larger part of our social lives than ever before. Therefore, the social implications of new media such as media spaces, virtual environments, ubiquitous technologies and novel mobile computing platforms need to be investigated. The 'social shaping of technology' is a perspective, which argues that rather than being an autonomous factor causing social change, technology is better viewed as reflecting and embodying social arrangements. Thus, users of technology will to some extent be (pre)configured by prescribed uses, which are embedded in these media from the stage of

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their design and production. On the other hand, users are active, socially situated 'decoders' of these technologies, and will 'appropriate' them to their own needs and requirements. Hence, they will create new and emergent uses.

In this sense, the following are some of the most important research objectives aiming to investigate the social impact of rich and mobile media:

- focusing on the processes of social shaping, including their development, diffusion, adoption, domestication and appropriation in domestic, work and public settings;
- exploring the social dimensions of these media through a variety of methods;
- designing and evaluating a number of small-scale technology interventions in different settings; and
- discussing the political issues, which are at stake when these media are domesticated and appropriated in the public sphere.

How rich and mobile media are actually used is an empirical question rather than something that can be prejudged by theoretical models. Thus, in order to understand and assess these media, one has to be involved in a number of field studies of deployment, adoption and use. One should investigate how rich and mobile media can be effectively appropriated by the differently-abled, the young and the old, the economically rich and poor, the educational elite and the excluded. Thus, ethnographic field studies should form one basis for such a work. Benefits of this approach are:

(i) that interactivity with users through semi-structured discursive interviews provides a rich, deep and mutually intelligible interpretation of the observed processes;
(ii) that by visiting the users' locales, the ethnographer is able to observe the real local settings in which the studied technologies are applied; and
(iii) that the ethnographer's (limited) participation into the users' local settings makes possible the disclosure of the real conditions under which the studied technology is appropriated (which might be different from the ones originally inscribed in the design and development stages).

Nonetheless, a qualitative approach such as ethnography cannot provide sufficient data to investigate all the issues that concern rich and mobile media. Various other techniques should be deployed that include interaction analysis supported by video data, as developed in 'work practice' studies (Luff, Hindmarsh & Heath, 2001) and such things as digital diaries (Sellen & Harper, 2001). Rich and mobile media should provide further opportunities for data gathering, including remote messaging, note-taking and data access logs, providing more quantitative measures (Taylor & Harper, 2001). Other evaluation methods used in the work analysis and human-computer interaction fields should also be employed as appropriate. These include surveys of rich and mobile media up-take, web-based interviews of attitudes and skills, usability studies, as well as envisioning processes focusing on such things as the smart home and new ways of working. Certain intervention studies should be planned in order to provide us with empirical data on the emerging issues involved in the digital society and allow us to go beyond mere speculation and forecasting techniques such as Delphi. These studies should be further combined with comparative investigations of cultural, economic and political differences across Europe.

Therefore, one is needed to conduct a number of case studies across Europe, in which one would explore features of the complex chain of production-consumption of rich and mobile media. The output of these case studies would define the following four topic areas:

- *The social shaping and patterns of adoption of rich and mobile media in domestic settings*. In their own homes, individuals not only define their personal distinctive ways of life, but also negotiate and reconstitute the meanings and significance of the technologies

that are made available to them. The technology itself limits and enables these opportunities through the general quality of its design, which will make rich mobile media either suitable, user friendly or wholly resistant to practical, beneficial deployment. Thus, the objective of the set of case studies in domestication will be to explore the interrelationship between these elements.

- *The evolution and socially mediated adoption of rich and mobile media in working environments*. This set of case studies will explore several different workplace settings in which various kinds of rich and mobile technologies are supporting current and emergent work processes and both co-proximate and remote forms of collaboration. The role of rich and mobile media and its relationship to the work processes in question will of course vary in each case, at times supporting so-called virtual teams and in other locales supporting the ad hoc provision of rich media for individuals working away from their base office. Key to these studies will not only be mapping social shaping factors from production through to consumption and determining the associated success factors, but also exploring what additional opportunities for novel business practice rich and mobile media might provide. One way in which novel organisational forms may be investigated is through the implementation, albeit on a small scale, of novel rich mobile media.

- *The transformations and evolution of technologically mediated behaviour in public spaces.* Public spaces exist alongside domestic and workplace settings. Here is where the needs of individuals as members of families, of organisations and as citizens of particular polities also merge. Yet, historically, there have been few studies that have looked at how rich and mobile technologies can be used and shaped in these settings. There have been few attempts to define what are the appropriate analytical distinctions that need to be brought to bear from the various disciplines that have interests in public space and the technologies used therein, whether it be architecture, urban geography and planning, or more traditional disciplines such as anthropology, sociology and psychology. Accordingly, this set of cases will explore the notion of public space before undertaking investigations of a number of domains, including transport termini; shopping malls and markets; and museums and other settings of 'cultural performance.'

- *The socio-political economy of rich and mobile media in relationship to citizenship.* To provide a comprehensive account of political issues for new rich and mobile media in relation to the 'digital divide,' social inequalities and social exclusion also need to be examined. From the intrusion of rich and mobile media into the private space of individuals stems a number of perplexing ethical and legal issues (such as risks of deception, fraud, abuse, inauthenticity, nonconforming behaviour, copyright and intellectual rights, possible threats to privacy and increased social control through surveillance). From the point of view of citizenship, it is imperative to comprehend how rich and mobile media might influence democracy and whether the corporate global media explosion might result in a corresponding implosion of public life. Therefore, one should be concerned in the case studies to provide a thorough assessment of these political issues in relation to the empirical findings and to formulate recommendations for public policies of "best-practice" concerning rich and mobile media.

All the above case studies of naturally occurring social activities in various settings need to rely on well-founded methods and techniques and will explore novel data collection and analytical tools made available through the use of rich and mobile media. Necessarily, these methods need to combine qualitative and quantitative tools.

State of the art of relevant research

Rich Media: Video-mediated communication (VMC) or videoconferencing is a synchronous (real-time) communication system simultaneously transmitting both video and audio (Falk, 1973; Williams, 1977; Ochsman & Chapanis, 1974; Conrath *et al.*, 1977; Gale, 1990; Finn *et al.* 1997). From various perspectives (including ethnography), VMC has been studied by

Heath & Luff (1991; 1992a; 1992b); Heath *et al.*, 1997; Sellen, 1992; O'Conaill *et al.*, 1993; Gaver, 1992; Tang and Isaacs, 1993, 1994; Fish *et al.*, 1992, 1993 (among others). A collaborative virtual environment (CVE) is an artificial space where several people interact and work together through networked computers and virtual reality systems – manipulating avatars or 'user embodiment' (Benford *et al.*, 1994b; Baecker, 1993; Park *et al.*, 2000; Bowers *et al.*, 1996; Tang, 1991; Benford *et al.*, 1995; Hindmarsh *et al.*, 1998; Greenhalgh & Benford, 1995; Benford *et al.*, 1994a; Boudourides, 2000). The place/space dialectics (Giddens, 1984) is discussed by Harrison & Dourish (1996). The social character of virtual environments has been studied by Jeffrey & Mark (1998) and by Becker & Mark (1998; 1999) through theories of Giddens (1990) and Habermas (1987), and by Fitzpatrick *et al.* (1995; 1996) through the social world theory (Strauss, 1978, 1993; Clarke, 1991).

Mobile Media: Mobile and wireless computing-communications are considered as the fastest growing sector of ICTs (Pandya, 1999; Negus *et al.*, 2000). First-generation analog systems (as AMPS, TACS and NMT) were introduced from the early 1980s (Rappaport, 1996) and second-generation digital systems (as GSM, PDC, IS-136 and IS-95) in the late 1980s (Steel, 1990; Tabbane, 1997). Currently, we are passing into third-generation (3G and GPRS) systems with high-bit-rate and broadband multimedia services (Fasbender & Reichert, 1999; Sollenberger *et al.*, 1999). The advances in the new ICTs cover such diverse areas of applications and services as paging systems, cordless telephones, cellular mobile radio systems, wide area wireless data systems and wireless LANs (Beaubrun & Pierre, 2001).

Ethnographic Studies: At the heart of ethnography lies the 'reflexive turn' in anthropology and sociology (Hammersley & Atkinson, 1995). Thus, ethnography analyses human practices in the context of culture (Geertz, 1973) based on fieldwork, participant observation and the comparative perspective, attempting to attain a reconstruction of key events in social discourse, a disclosure of emergent cultural patterns. However, it should be mentioned that the heterogeneity of ethnographical studies (two representative examples: Goffman, 1959, 1961, and Skolnick, 1966) has made ethnography to appear as "one of those catchall words whose meaning is extremely general and vague" (Harper, 2000a, p. 241). In fact, various hybrid approaches (combining ethnography, audience research, discourse analysis, textual analysis, autobiography, etc.) have been and are applied to analyses of the new ICTs (see Cooper *et al.*, 1995; Hine, 2000; Boudourides, 2001).

Social Shaping: According to the theory of the Social Shaping of Technology, technology is socially shaped, rather than an autonomously developing process that causes social change. In other words, technological innovations are seen to "embody social arrangements" and, thus, they constitute complex social processes through which every part in the production-consumption chain of a technological innovation (from design, development, adoption and use) is overwhelmingly shaped by social factors (Williams & Edge, 1996). In particular, the stage of product development is seen as a discursive communicative process (Hymes, 1972; Sacks *et al.*, 1974; Schegloff, 1992, 2000); the stage of adoption is considered to be prevailed by social network dynamics (Valente, 1995); the stage of use or consumption is described by transcription (Callon, 1986; Latour, 1987), representation (Akrich, 1995), configuration (Woolgar, 1991) and it is socially situated in domestic settings or appropriated in the workplace (Sørensen & Berg, 1991; Silverstone & Hirsch, 1992; Cawson *et al.*, 1995; Mansell & Silverstone, 1996). Such a full range of technological adjustments, from user configuration and appropriation to resistance and reconstitution constitutes what André Vitalis and Thierry Vedel call '*socio-politique des usages*' (Vitalis, 1994; Vedel, 1994; Chambat, 1994), Bryan Pfaffenberger calls a technological drama (1992a, b) and Andrew Feenberg identifies with a process of "democratic rationalization" of technology (1999).

Domestication: By this we mean the focus of the informatisation of everyday life on the specific cultural space and social field of the household (Haddon, 1988; Silverstone & Morley, 1990; Silverstone, 1991, 1997; Silverstone & Hirsch, 1992; Silverstone and Haddon,

1996; Nippert-Eng, 1997). Silverstone, Hirsch & Morley (1992) distinguish four phases in the dynamics of the household's moral economy: appropriation, objectification, incorporation and conversion. Rich data on domestic connectivity have been reviewed by a recent NSF study (2001; Bikson & Panis, 1997, 1999) but it is restricted in the USA context. In that study five categories of impact research were identified and addressed: (1) time displacement studies, (2) teleworking/telecommuting, (3) psychological well-being, (4) informatics and healthcare and (5) video games and children. Other recent research in the area includes: Studies of the 'home of the future' in USA by Venkatesh (1987) and Venkatesh *et al.* (2000), Internet use in Canada by Bakardjieva & Smith (2001), Internet use in five European countries (Haddon, 1999), family life in a UK digital home by Anderson *et al.* (1999) and young people and new media in Europe by Livingstone (1998) and Livingstone & Bovill (2001).

Mobile Settings and Work: Mobility manifests the tendency of the new ICT artefacts to become increasingly portable and as such to be increasingly individualised in their consumption (Kehr & Zeidler, 2000). Mobility in collaborative work, 'anytime and anywhere,' is being extensively studied (Whittaker *et al.*, 1994; Belloti & Bly, 1996; Dix & Beale, 1996; Luff & Heath, 1998; Kristoffersen *et al.*, 1998; Bergqvist *et al.*, 1999; Wiberg & Ljungberg, 1999; Varshney, 1999; Eldridge *et al.*, 2000; Lamming *et al.*, 2000; Kaikkonen & Törmänen, 2000; Churchill & Wakeford, 2001; Ramsau & Nielsen, 2000; Perry, O'Hara, Sellen, Brown & Harper, 2001; Wiberg & Grönlund, 2001). Social impacts of mobility have been studied by Dryer *et al.* (1999) from the point of view of promotion or inhibition of relationships and Kim (2001) in relation to Internet uses. Concerning mobile phones, Palen *et al.* (2000) have reported results of uses, Taylor & Harper (2001) studied the behaviour of young people through activity theory, Ling & Helmersen (2000) have investigated the question of the appropriate inception of use by pre-adolescents, Townsend (2000) explored the occurring metabolism of urban systems and Wei & Leung (1999) analysed uses (and misuses) in Hong Kong. General references to workplace settings of rich media are Heath & Luff (2000) and Luff, Hindmarsh & Heath (2000).

Digital Divide and Social Policy: One of the hottest issues in debates on the information society is the digital divide between the 'information haves' and 'have-nots,' the so-called 'information underclass' (NTIA, 1999, 2000; van Dijk, 2000). For some, there is evidence that the prevailing tendency in Europe is ('pleonastically') exclusive (Sarikakis & Terzis, 2000). Similarly, the media critic Robert McChesney (1999) argues that richer media might imply poorer democracy in the sense that the corporate media explosion could result in a corresponding implosion of public life. In the context of housing, Marsh & Mullins (1998) have accomplished a useful exploration of social exclusion and they remarked that the sources of social exclusion have to be sought beyond relative deprivation and to be related to social participation and integration. Somerville (1998) has given some explanations of the social construction of exclusion and argued for the importance of social mobility. Ratcliffe (1998) has incorporated the dimensions of race and national inequalities in the context of housing. According to Leslie Haddon (2000) the mechanisms of social exclusion around ICTs should be also focused to: (i) processes of self-exclusion, (ii) forms of access and (iii) the quality of the experience of ICTs. In these perspectives, Haddon (2000) has conducted a detailed qualitative research on processes of inclusion-exclusion for single parent and young elderly households. Leung & Wei (1999) have investigated the mobile phone have-nots and the factors at work. Furthermore, rich media raise difficult ethical and legal problems related to privacy (Mackay, 1995) and copyright and intellectual rights issues (Tang, 1997).

Aimed research advances

On Domestic Settings: It is clear that rich mobile media will find an important role in domestic settings, but most prior studies in the area have been "too theoretical to guide the design of technology or to understand the social shaping and impact of interactive technologies" (Harper, 2000b). Nor has prior research been comparative (Brown, 2000;

Hughes *et al*., 2000). Thus, one should aim to fill this void by undertaking an innovative blending of ethnography, quantitative tools and light-weight technological interventions involving rich mobile media in smart homes. One should explore socio-demographic factors and differences and identify how many households have purchased or have access to rich and mobile media and who within the household uses those technologies (by age, sex, education, occupation and so on); one should use ethnographic methods to analyse the inter-relationship between the use of rich mobile media and individual identity, practical action and cultural difference; and finally, one should explore what future forms domestic rich mobile media might take through scenarios and implementation of various light-weight technology interventions in smart home environments.

On Working Environments: Given the remarkable developments of technology to support activities in the workplace, it will be important to study how new tools and technologies feature in everyday organisational conduct. To this end, a set of case studies in working environments should contribute to the growing number of 'workplace studies' by exploring the details of naturally occurring activities in various settings supported by different configurations of rich and mobile media. These should focus on the fine details of human conduct and co-ordination and should explore how the working procedures and practical reasoning of the members of particular settings and organisations rely upon 'seen but unnoticed' resources through which organisational activities are accomplished in and through tools and technology. These studies should focus on particular domains where specific developments in rich and mobile media technologies seem to be most relevant. Example working environments should include distributed and co-proximate work settings of various kinds, including organisational management activities, new product development, warehousing, emergency and support service environments, as well as various forms of knowledge-based office activities. Thus, what is needed is the combination of breadth and depth concerning both the settings to be investigated (workplace, home, public space, "on-the-move") and a variety of investigative methods to be employed (participant observation, interviews, surveys, data logging, focus groups, prototype evaluations, heuristic analyses, etc.).

On Public Spaces: Here one should be concerned with the use of a range of technologies in diverse public domains, including shopping malls and precincts, static kiosks, stations and other transportation locations and educational establishments, such as museums and galleries. What is of particular interest is how rich and mobile media can combine public displays with the use of mobile and wearable devices in order to support a range of forms of social interaction, collaboration, e-commerce or simply location-based information services. Of specific concern should be to show how the shaping of social behaviour in public spaces by co-present others would be affected and altered by the introduction of new technologies which would facilitate communicational interactions and would allow the behaviours of persons remote in time and distance to have an effect. The role of existing artefacts should also be studied and how their role is altered through rich mobile media. Finally, scenarios should be developed for enhancing the user experience of rich mobile media at both an individual and communal level. Given the dearth of such studies available at present, one should provide much needed analyses of great relevance to business organisations exploring new services for the population.

On Innovative Technology Interventions/Evaluations: Investigating the social shaping of rich and mobile media should not just be a passive exercise but should also involve various small scale technology interventions/evaluations, undertaken in parallel with the study of the social impact and the assessment of these media. These should involve the deployment and evaluation of prototype, demonstrator and 'off the peg' tools and technologies, which might serve to enhance particular activities in works spaces, domestic setting and public environments. They should include more conventional experiments where for example subjects are required to undertake a series of tasks in experimental conditions with a

particular system or device. They should also include 'quasi-naturalistic experiments,' in which particular tools or technologies are given to a number of participants in ordinary everyday domains and participants are asked to employ the systems or devices where possible. These different approaches should compliment each other and would provide the basis to development of an intervention methodology. Technology interventions should be undertaken with regard to the various application domains one is studying; including workplaces, the domestic environment, and public domains (including museums and galleries). The actual interventions should be determined during the course of the study, in the light of the conducted empirical studies and technological developments in which one should be involved. However, it should be envisaged that technological interventions would include:

- the evaluation of mixed reality environments (collaborative virtual environments with interdispersed video) designed to support artefacts based interaction amongst multiple distributed participants;
- and the deployment and evaluation of portable devices to visitors in museums and galleries which provide real time access to enhanced information concerning exhibits and the ability to have real time communication with others.

On Citizenship and Social Policy: Through ethnographic methods, surveys and interviews, one should approach the problem of non-adoption and non-adopters of these media. The goal should be to answer in the European setting questions like these: Who are the have-nots of rich and mobile media, what characterises them and what are the explanations for their non-adoption behaviour? In particular, with regards to the factors at various levels, which discourage the use of these media, what is the influence of socio-economic and demographic variables? Does the ownership and adoption of other more traditional media reduce or booster rich and mobile media? What is the perception of values, benefits and advances deriving from the new rich and mobile media? What special new needs do rich and mobile media create? How are these media transforming traditional and existing modes of exclusion? Is the gap of the digital divide widening? If yes, is there any resistance or any other sort of reaction to this increased social exclusion from the side of the have-nots? One should be focusing in sensitive groups of the European population (such as people with disabilities, pre-adolescent, adolescent, young and elderly people, single parents, women, ethnic minorities, etc.), for whom there exist corresponding data and analyses on other media and technologies studies. Furthermore, the aim is to yield public policy recommendations, in which the perceived adequacy of rich and mobile media policies is evidenced by the different stakeholders and is measured by the degree of correspondence between policy intentions and effects, defined in relation to the interests of particular stakeholders and in relation to benchmarked criteria. These recommendations should include:

(i) a 'community principle,' which will enable actual performances to be measured, and best practices with respect to the quality of service provision and the accessibility of public authorities to be suggested;
(ii) an 'enabling principle,' which will estimate the extent to which these policies may reduce information inequalities.

Moreover, one should intend to cover ethical and legal problems (such as risks of deception, fraud, abuse, inauthenticity, nonconforming behaviour, possible threats to privacy and possible increased social control through surveillance) in relation to rich and mobile media distribution, access, control and use and also copyright and intellectual rights issues related to the content of rich and mobile media.

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