

Re-Determining Design in a Global Network

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Paper for DRS Futureground Conference,
Monash University, Melbourne 17-21 November 2004

This paper argues for a framework for design research with which to explore the relationship between new information technologies, globalisation and social exclusion

It examines the role of design in overcoming the so-called Digital Divide within a global production and consumption network driven by information and communication technologies (ICTs). It does so by problematising the design and development of the key technology and its social organisation within a neo-liberal economic framework.

The relationship between new information technologies, globalisation and social exclusion has become a focus for discussion amongst major social theorists (Castells, 1996, 1997, 2000; Giddens, 1999, Ohmae, 1995). Most take the shape of the technology and its social organisation as unproblematic although concern is expressed about the distributive spread of the technology and the level of access of low income groups and areas. Ohmae talks of a triad of core economies – North America, East Asia and North West Europe. Beyond this core is a “borderless world” in which direct foreign investment seeks areas of highest GNP regardless of political boundaries - his “zebra strategies”. The consequences for regions and nations beyond this system are discussed in terms of the Digital Divide¹.

This paper sets out an argument, developed at greater length elsewhere (see Little & Ando, 2002; Little, 2004) premised on a unique opportunity to link the wired and unwired worlds. It argues that the exploitation of this opportunity requires a design research framework which encompasses both the social learning required from the new user groups enjoying access to the key ITCs and the technical design process of that technology itself.

¹ The U.S. IT industry has sponsored the Digital Divide Network, see <http://www.digitaldividenetwork.org/>

ICT AND THE CURRENT MODE OF GLOBALISATION

Globalisation of the world economy has increased the significance of both intellectual property, in the form of increasingly globalised brands and of advanced technologies, and intellectual capital in the form of. The resources and capabilities of highly trained and educated workforces. Historically the bulk of this intellectual capital has been located outside the developing regions and countries but both are now leveraged by information and communication technology.

The digital divide transcends first world/third world distinctions because the networked nature of globalisation means that excluded areas exist between the economic nodes in developed as well as in developing regions. For example, within British cities such as Manchester “third world” conditions are reproduced in low-wage enclaves which serve an identical purpose in the production chain to their Asian counterparts.

As a result, competition from low cost regions of the emerging global market has led developed economies to shift their focus towards the end of the production chain where product differentiation and customer support can maintain demand for goods and services in a global chess game of resources and capabilities. Earlier models of multinational development and technology transfer described orderly flows of technology from centre to periphery (eg Hirsch 1967). Now there is an interpenetration of core and periphery in which market, processing and raw materials source, and production and consumption are increasingly co-located without being integrated into a self-sufficient economy. The re-distribution of these activities during each product life cycle further undermines the traditional concepts of centre and periphery.

This means that smaller players require geographic leverage that can be delivered through new forms of adjacency inherent in the current generation of information and communication technologies (ICTs).

DESIGNING A FUTURE: DEVELOPING ALTERNATIVE PATHS

From a design perspective the audience and the terms of access to this global discourse are determined by the “big design” of high technology

systems. The dominant economies dictate the direction of development in these technologies. However, within the new connectivities and adjacencies delivered by the same technologies, small, collective, distributed design is providing a voice from those left outside the formal hierarchy of distribution. High technology – in a literal sense in the form of satellite based communication – is providing the last crucial link in connectivity between the wired core and the unwired periphery. This global access has been provided by a technology associated with top down surveillance and the Cold War military history of space race and satellite development. However, alternative development pathways have been foreshadowed since the 1980s and 1990s.

The Centre Mondial Informatique et Ressources Humaines in Paris promoted the use of state-of-the-art computing technology in Saharan and sub-Saharan Africa (Roper; 1983). This deployed the work of Seymour Papert (1980) as evidence of the ability of the new information and communication technologies to short-circuit the learning curve of earlier industrialisation processes. Sproull and Kiesler (1991) drew on research conducted in this period to argue for attention equal to that given to technical learning to be paid to the social learning demanded by new technologies.

In the 1980s and 1990s in Australia the Queensland State Government made extensive use of the domestic Aussat system to support services in remote areas, for example in medical diagnosis and in in-service training. The Tanami Network was established in central Australia to deliver services to remote aboriginal communities. While much was learned from this system, it carried the burden of significant investment in the maintenance of state-of-the-art ground facilities. Subsequent developments which built on this pioneering experience made use of land-line telephony in order to achieve a locally sustainable solution (Morrison, 2000).

However, by the turn of the twentieth century technical progress offered the means to join the wired world to the unwired world in a way which removed the significance of spatial separation, at least in the quality of the information infrastructure critical to the emerging global economy. The shift from geostationary Earth orbits (GEOs) to medium Earth orbit (MEO) and low

Earth orbit (LEO) satellites (Price-Waterhouse; 1998) promised to render the current communications infrastructure largely obsolete.

The technology to achieve low and middle earth orbit is simpler and more accessible than that required for geostationary orbits, more importantly, the laws of geophysics ensure equally intensive coverage of all areas below the orbits of the satellites, regardless of OECD status.

A number of systems using various combinations of direct inter-satellite communication and a low number of ground-stations have been attempted. These systems target current affluent users of mobile communications, rather than the 3.9 billion people judged to have no telephone service available and their development in the face of cheaper established terrestrial cell-based communication services has been slow. The Teledesic system originally proposed a total of 840 broadband low-earth orbiting (LEO) satellites communicating directly with individual personal computers but its broadcast frequencies were surrendered to the U.S. Federal Communication Commission in July 2003. The Iridium system, following a re-launch under a new company in 2001 currently consists of 66 LEOs plus 14 orbiting spare satellites and services are now marketed at a premium to businesses and workers remote from established communications infrastructure.

Nevertheless these shifts in technology offers a window of opportunity for countries and regions disadvantaged by the current distribution of communication infrastructure to link into globalised systems. A new paradigm is emerging but peripheral users need to utilise features of mainstream technical developments as far as possible as exemplified by the appropriation of ICTs by groups with varied disabilities Earls (1990). Earls shows that considerable sophistication in the evaluation and use of elements of mainstream technology is needed by any group wishing to access the potential benefits of a mainstream solution. The removal of the barrier of physical and technical infrastructure leaves the problem of social and institutional infrastructures and the assumptions built into extant systems, as noted by Morrison (2000).

Effective social learning in the new technical space is already evident. The ability of current protest movements to achieve real-time direct access to

a global audience through a combination of mobile computing and Word Wide Web technologies is evidence that such tactics can work. For example, accounts of a police attack upon women workers occupying Brukman, an Argentinian clothing factory, were rapidly disseminated as the Brukman Battle², the Columbia Report web site³ gives global visibility to events in both government and guerrilla controlled remote locations while the Mexican Zapatista Movement's astute use of web technology⁴ has become a standard point of reference.

BUILDING ON EXPERIENCE: WIDENING THE REMIT OF DESIGN

Within the technical design community responsible for the new infrastructure alternative models of collaboration and development are emerging. The Open Software Foundation (OSF) promotes a collective approach which challenges the centralised Microsoft model of commercial software development (Raymond, 2001). This collaborative model of shared practice and experience echoes the non-technical communities which have also made use of the web as a space in which to share collective experience and develop collective skills.

The prevailing top down approach is still evident in the development gateway established by the World Bank but criticism of the closed view and gate-keeping potential of this web portal has come from the authors of peer-to-peer models of interaction that share grass-roots origins⁵. National governments share a similar view of "e-government". The accessibility of the Internet has been seen as an interface between the citizen and the government, rather than a space in which change and adjustment can take place.

In the Indian sub-continent e-governance is being approached from both top level government and local community levels. These coalesce in Pondicherry, where a hub-and-spoke model of data and communication has

² See <http://www.geocities.com/seumasach/Digital14.html>

³ See <http://www.colombiareport.org/index.htm>

⁴ See <http://www.eco.utexas.edu/Homepages/Faculty/Cleaver/zapsincyber.html>

⁵ See <http://www.edc.org/GLG/gkd/> for archived discussions

been established for six villages⁶. The villages can communicate with each other as well as to the Internet. Dial-up Internet connection is accessed by a variety of wired and wireless paths, utilising solar power. A major objective is ownership at the village level, with support available from the hub.

Elsewhere in India the issue of robust and affordable technical platforms suitable for such environments has been tackled through the development of the Simputer⁷, a robust low-cost hand-held solar powered device suitable for non-literate users. Even this low cost device must be shared around a village community, and commercial smart card technology has been used to provide a cheap and robust means of securely storing individual data away from the device.

Early applications for the Simputer include the field collection of information on crops under cultivation for the government of Karnataka and the support of mobile applications for micro-finance institutions.

An even more remote community has been reached through satellite linked, solar powered, hand held technologies have already found use amongst the illiterate bushmen of South Africa (Little, Holmes and Grieco, 2001). The Cybertracker system enables the bushmen of the Kalahari to instantaneously transmit information beyond their local boundaries. By touching of an icon on the screen of the hand-held set or by drafting of an animal form through the etch-a-sketch function of the technology important environmental management data can be sent to a receiving agency. The same technology could be used in the provision of services and extension of political participation for this remote and otherwise un-connected community.

Open software development (OSD) means that these and similar products are both affordable, and amenable to adjustment and development in line with local conditions and with local resources. Such adjustments make the services which are supported both more closely relevant to the end users, and more robust in terms of their cultural consonance with local practices. Thus is in marked contrast to the dominant Microsoft model of commercial development within the United States. Minority language communities may

⁶ See <http://www.mssrf.org/informationvillage/assessment.htm>

⁷ See <http://www.simputer.org>

never be served with their version of the software (and this is only ever likely to be a direct word-for-word translation of pre-existing menus). They are also denied access to source code to fund and provide this adaptation for themselves.

Standards are necessary for interoperability at each level of interaction within and between organisations and locations. O'Hara-Devereaux and Johansen (1994) argue that differences between work cultures, both professional and corporate, and the primary culture in which an organisation is embedded can be bridged in a "thirdspace". For them the synergy between levels is a potential resource, but the tendency towards a convergence determined by the primary culture is seen as an obstacle to cross-cultural working. Culture needs to be de-composed into issues related to the historical, geographical and institutional setting in which organisation and individual must operate. The business recipes and frameworks grounded in these differences offer a view of "culture" of more direct value to actors (see for example Marceau, 1992).

SOCIAL AND TECHNICAL DESIGN

The OSD paradigm has a wider contribution to this discussion. Despite the increased use of ICTs much employment, particularly in the growing service sector, and in health and tourism, requires physical presence, and increasing mobility has meant the development of diasporas and overseas communities of longer and shorter duration. The support of Internet technologies allows the maintenance of community and identity described by Miller and Slater (2000) in the case of Trinidadians. Crucially the remittance of essential funds through an efficient micro-banking system, such as the Grameen system in Bangladesh (Yunus, 1999). This ensures that resources are returned to the home location for development purposes (Little Holmes and Grieco, 2000). The Grameen Bank has extended its activities to the support of communication technologies for poor village women as part of their empowerment⁸. This gives the women an ability to check on market prices

⁸ See <http://www.grameenfoundation.org/>

and to better organise their finances and production. Elsewhere fishermen use the technology to check market prices before landing their catches. The Self Employed Women's Association in India, make use of the World Wide Web to promote its cause of advancing the interests and improving the situation of poor women⁹

In the case of Ghana, both cultural and commercial sites maintain the contact with home and provide a family-based reliable infrastructure for access to wealthy markets by Ghanaian¹⁰ goods for the continuing support of that identity in the USA and America is remarkable. The benefits of a migrant link-up to the community net of the place of origin are many: with the establishment of an efficient micro-banking system linked to a community net funds can be readily transferred from migrants in the wealthier location back to their home site for development purposes.

Information and communication technology introduces new social practices and social patterns allowing the collective development of skills and their transmission across the expanding network. The voice of the small social and political unit can now gain volume through co-operation and communication within the institutional capabilities of the new ICTs (Little, Holmes and Grieco 2000). Ensuring that technologies appropriate for small and remote locations emerge must be a priority. Such technologies require the engagement of other users and beneficiaries and require an appropriate orientation by the designers involved.

A FRAMEWORK FOR DESIGN RESEARCH

In the past developing new practices and new knowledge has required proximity or adjacency to others who hold a relevant set of skills and interests. The physical adjacency necessary in the past can increasingly be supported electronically. The OSF model demonstrates this in a technically focused community. However, sufficient skills for effective use of the Internet in support of advocacy and communication can be acquired relatively simply.

⁹ See <http://www.sewa.org/>

¹⁰ See <http://www.ghaclad.org> for examples.

The process of skilling can draw on extensive experience with electronically supported distance education and the “e-mentoring” techniques enumerated by Salmon (2000). The approach required is that of participative action research in which experts and users explore issues and solutions collectively (Badham, Couchman & Little, 1995) The objective is the establishment of a virtual form of the communities of practice in the terms described by Wenger (1998)¹¹.

New electronic forms of adjacency are critical to the development of new practices and knowledge. The new technology creates the opportunity for individuals and agencies which are physically distant from one another to be in real time public contact with one another: it is a new collective form of social contact. Electronic adjacency permits instantaneous interaction between distant individuals: new forms of knowledge are generated in this new interactive practice though social and political theory have been slow to document and analyse this new social state (Carter and Grieco, 2000). The speed and ease of new communication over distance enables the collecting together of views and opinions which were historically fragmented and disparate. Crucially, the transparency of this discourse permits the opportunity for those who were historically excluded from decision making to enter core domains.

The grass-roots response to top down prescriptions provides an opportunity to close the loop of e-governance and to provide quality real-time feedback on the consequences of policy decisions made by governments¹². Such action-based research offers new prospects for both the evaluation and development of information systems themselves, and the maintenance of support form across the affected community identified by Sauer (1993) as a key to successful design project outcomes.

¹¹ For an example of such a community of practice see http://www.geocities.com/the_odyssey_group/

¹² for an example of such real-time monitoring see <http://www.newnet.org.uk/neat/monitor/> and http://www.geocities.com/north_east_age

REFERENCES

- Badham R., Couchman P. and Little S.** (1995) "A Human Centred Approach to Simulation: A Case Study of Software to Support System Design and Development" Proc HICSS-28: Hawaiian International Conference on Systems Science, Maui, January 1995 Vol.IV Information Systems IEEE Computer Society Press, Los Alamitos CA. ISBN 0-8186-6945-4, pp.861-870
- Castells M.** (1996) *The Rise of the Network Society: The Information Age: Economy Society and Culture Volume I* Blackwells, Oxford.
- Castells M.** (1997) *The Power of Identity: Economy Society and Culture Volume II* Blackwells, Oxford
- Castells, M.** (2000) *End of Millennium: The Information age: Economy Society and Culture Volume II* 2nd ed. Blackwells Oxford
- Carter C. & Grieco G.** (2000) "New deals – no wheels; social exclusions, tele-options and electronic ontology" *Urban Studies* Vol. 37 no.2 pp.1735-1748
- DeLamarter R.T.** (1988) *Big blue: IBM's use and abuse of power* Pan, London.
- Dicken P.** (2003) *Global Shift: transforming the world's economy*, (4th ed) Paul Chapman London.
- Earls J.A.M.** (1990) "Social integration of people with disabilities: the development of an information technology model based on personal growth and achievement" Unpublished PhD thesis, University of Wollongong.
- Galbraith J.** (1977) *Organization Design* Addison-Wesley, Reading, Mass.
- Giddens A.** (1999). *Runaway World: How Globalisation is Shaping Our Lives*. London: Profile Books
- Hirsch S.** (1967) *Location of Industry and Industrial Competitiveness* Oxford: Clarendon.
- Klingbeil A.** (2002) "IBM to quit making desktop computers" *Wall Street Journal* Jan. 09, 2002
- Little S.** (2004) *Design and Determination: the role of information technology in redressing regional inequities in the development process* Aldershot: Ashgate Publishing,
- Little S.E. & Ando A.** (2002) "Building of Virtual Common Ground: design participation for the network age" Proceedings of Common Ground: Design Research Society International Conference, Brunel University, September 2002
- Little S. Holmes L. & Grieco M.** (2000) "Island histories, open cultures?: the electronic transformation of adjacency" *Southern African Business Review* Vol.4 no.2
- Little S. Holmes L. & Grieco M.** (2001) 'Calling up culture: information spaces and information flows as the virtual dynamics of inclusion and exclusion', *Information Technology & People* Vol.14 no.4, 353-367

- Marceau J. (ed)** (1992) *Re-Working The World: Organisations, Technologies And Cultures In comparative Perspective* de Gruyter, Berlin, Germany
- Morrison P.M.** (2000) "A pilot implementation of internet access for remote aboriginal communities in Australia's top end" *Urban Studies* Vol.37 no.10 September 2000 pp.1781-1792
- O'Hara-Devereaux M. & Johansen R.** (1994) *Globalwork: bridging distance, culture and time* Jossey-Bass, San Francisco
- Ohmae K.** (1995) *The End of the Nation State: The rise of regional economics* Free Press, N.Y.
- Papert S.** (1980) *Mindstorms: children, computers and powerful ideas* Harvester, Brighton.
- Price-Waterhouse** (1998) *EMC Technology Forecast* Price-Waterhouse, Menlo Park, CA
- Raymond E.S.** (2001) *The Cathedral and the Bazaar musings on Linux and Open source by an accidental revolutionary* (revised ed) O'Reilly Sebastopol, CA
- Roper** (1983) French Flock to Centre *New Scientist* Vol.97 no.1344, 10th February 1983, pp.358-361
- Salmon G.** (2000) *E-moderating* Taylor & Francis, London.
- Sauer C.** (1993) *Why Information Systems Fail: a Case Study Approach* Alfred Waller, Henley on Thames.
- Sproull L. & Kiesler S.** (1991) *Connections: new ways of working in the networked organization* Cambridge: MIT Press.
- Wenger, E.** (1998) *Communities of Practice*, Cambridge, Cambridge University Press.
- Yunus M.** (1999) "The Grameen Bank" *Scientific American* November 1999 pp.114-119