BRINGING MULTIPLE PERSPECTIVES TO AUSTRALIA'S COMMUNICATION FUTURES: BEYOND THE SUPERHIGHWAY?

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A case study is presented of the multi-method and multi-discipline approach to anticipating the social and policy implications of new communication and information technologies (C&IT) being adopted by the Communication Centre at the Queensland University of Technology. This work draws on frameworks which include action research, structurational approaches to technology, coevolutionary systems theory, information economics, feminist and poststructuralist theories, and civilisational and critical approaches to futures studies. The main theoretical perspectives and methodologies we draw on are outlined, together with some of our research findings. Some future scenarios for communication in Australia, beyond the technological optimism of the information superhighway rhetoric, are presented. The often paradoxical relationship between technological change and social change is recognised. We argue that rather than being driven by the entertainment or commercially-oriented applications of the 'information superhighway', we need alternative future scenarios and designs for C&IT which facilitate cooperation, gender equity, inclusion of the Other and social justice.

Keywords: Communication and information technologies, multiple perspectives, alternative futures, social and cultural issues

INTRODUCTION

While the rhetoric of the 'information superhighway' is dominating debates on new communication and information technologies (C&IT) in Australia and elsewhere, other perspectives are emerging which challenge the current technological optimism that the information superhighway will become a dynamic force for social good, independently of considerations about underlying social, economic and political systems.

We believe that the Communication Centre at the Queensland University of Technology is playing an important role in these challenges through the development of new knowledge and ideas, the use of action-oriented and collaborative research methodologies, and critical approaches to the future. The Centre's history of work in this field is summarised in the appendix. This paper presents a case study of the multi-method and multi-discipline approach which the Centre is using to anticipate the social and policy implications of new C&IT. We overview a range of diverse theories, methodologies and issues in this paper in order to argue that this approach

provides a powerful means of analysing and understanding the many complex issues which have implications for Australia's communication futures.

Our particular focus is on the use of new communication technologies for creative and empowering alternative designs for research and innovation in working, living and learning. Such new designs include participative planning and community development processes, sustainable and transformative economic development systems, creative learning organisations, and interactive education and training. Within this framework, the design and implementation of new technologies for such processes would draw on the principles of cooperation, gender equity, the inclusion of the Other and social justice. Our work has identified broad principles for policy design related to C&IT in the Australian, Asia-Pacific and global contexts.

Theoretical perspectives used in this work include action learning, postmodernism, poststructuralism, (as well as work which is critical of the postmodern discourse) a range of recent feminist theories, social shaping of technology and structurational approaches to technology, coevolutionary systems theory, an information economics perspective, and civilisational, critical and epistemologically-oriented approaches to futures studies.

In this paper we discuss how we are using these frameworks in an interdisciplinary way to consider the social and policy implications of new C&IT. The two broad theoretical foci in our work, namely the systemic issues and social and cultural issues are outlined. We acknowledge the complexity and limitations present, as well as recognising the interrelationships between them. Related methodological issues are also considered. A Communicative Age scenario for Australia's future is contrasted with the Conventional Age and the Artificial Age scenarios. We argue that the Communicative Age presents an opportunity to use new C&IT to solve social problems rather than be driven by the entertainment or commercially-oriented applications of the information superhighway.

THEORETICAL AND METHODOLOGICAL FRAMEWORKS

Multiple theoretical perspectives

In conducting our assessments of technology we draw on a range of contemporary social science theories and methodologies. We have not identified one framework which we believe can provide adequate answers to all of the complex issues involved and therefore we have deliberately adopted a systematically eclectic approach. In so doing however, we believe that while our approaches have complementarities, there are also inevitable contradictions and tensions in our work.[1]

Tehranian argues that the key frames in communication theory have been: mechanical (from Newtonian physics), organic (from Darwinian evolutionary theory and Marx), cybernetic (from Weiner and Shannon and Weaver) and linguistic (the influence of semiotics and poststructuralism).[2] Centre researchers have used some of these perspectives but also bring in the ecological (concerned with holistic interconnections), the feminist (the gendered nature of technology and science), the civilisational (the cultural nature of discourse and technology) and seek to articu-

late post-postmodern frames of knowing, or what has been called a 'global ethics'.

Thus, while our research draws on postmodernism and poststructuralism, we are also critical of aspects of these frameworks.[3] Further, although poststructuralism offers a useful critique of technological determinism, there is also a need to focus on the inequalities experienced as part of people's lives, particularly those of the poor, the non-Western and women. Given the continuation of a technologically-oriented approach which ignores social and cultural issues, and the creation of a cyberspace in which selves exist largely without responsibility, such groups will tend to be excluded from access to new C&IT and their knowledge, needs and experiences ignored or devalued in the design of such technologies. We would argue that the use of action learning is an important means of generating actionable knowledge about disenfranchised groups and the development of technologies which meet their particular needs.[4]

As discussed, there are currently two main sets of issues and hence theoretical focuses to our work on communication futures: systemic issues and social and cultural issues. Firstly, some of our work has adopted a co-evolutionary paradigm to examine the systemic features of new technologies.[5] This work is particularly influenced by recent thinking regarding complex and chaotic systems and the evolutionary economics of technical change, as well as information economics.[6]

Whilst these frameworks provide useful macro analysis they do not always provide a critical examination of issues related to the social and cultural impacts of communication technology. For example, an important and frequently reported concern regarding new technologies relates to identity and gender issues in their design, access and use. Feminist and poststructuralist theories have been used to examine such issues.[7] Other research has examined communication technologies in the context of theories of consumption and identity.[8]

A related area of research concerning the implementation of C&IT examines the way people appropriate technologies.[9] By appropriation we mean how people adopt, learn about, use and routinise new technologies, and the influence of existing cultural, social and structural factors on this appropriation. In this regard, Gidden's structurational view of social change has proved useful.[10]

Finally, other research has examined how the particular framing of science and technology is civilisationally based.[11] By this we mean that science and technology are not universal but contextually based. What is advocated is that civilisations recover their ways of knowing and use them to develop their own sciences and technologies based on their own knowledge paradigms.

We are concerned not only with the policy level of determining how information technologies impact society, but how these categories in themselves frame what are appropriate definitional nominations of 'society'. Civilisations thus frame the notion of what constitutes information differently. For example, Zardar shows that non-Western information systems are dramatically different in how they constitute libraries as well as the traditional stable frames of communication theory such as data-information-knowledge-wisdom.[12] Thus, while technologies and the language used to describe them is often viewed in neutral terms, Centre research has placed them in contested terrain.

Methodological frameworks: a 'polylectical' approach

Along with these multiple theoretical perspectives, our research also uses a number of approaches to methodology, including critical frameworks and methods and action research. While there are numerous forms of action research, they share a focus on the open and participative sharing of ideas, knowledge and information, critical reflection, and the generation of actionable knowledge.[13] Action research is also a way of enabling desirable futures to emerge and be realised.[14]

We aim to actively involve and empower community, government and industry participants in our research activities. Since much of our work involves analysis of complex social, cultural and policy issues, future visioning, and developing strategies for change, we favour the use of qualitative methods. These include scenario building exercises, backcasting, discourse analysis, workshops, focus groups and semi-structured interviews.

However, we also draw on quantitative methods such as those used in the development of an innovative methodology for estimating future demand for telecommunications services. This multidisciplinary and analytical methodological framework also uses qualitative methods, incorporating social and cultural trends and issues.[15] The approach used in this framework goes beyond a strictly technological determinist approach to also address and integrate organisational and institutional demand drivers and inhibitors into the analysis. This framework was applied to estimate future demand for broadband services in telecommuting and health, and to estimate demand for ISDN services in regional and rural Queensland.[16]

It is our belief that the ongoing qualitative ('soft' data) versus quantitative ('hard' data) debate is misguided and that, used in a way which avoids defensiveness and a hierarchical view of knowledge, both approaches offer potentially valid and useful research outcomes. In fact, a systemically eclectic approach to theory and methodology, like the one we are advocating, may be the best means of dealing with the complexity of social, economic and cultural issues in the process of technological and social change.

In adopting our approaches to analysis, we aim to be anticipatory, educative and change-oriented in our work. Futures studies perspectives have been useful in meeting this aim. This has included painting a very broad global canvas for our studies with particular attention to the non-Western and Asia-Pacific contexts.[17] We believe that if the viability of humanity and its social development are important, we must show serious concern for our longer term future, beyond tomorrow's balance sheet. Futures studies can prove useful for this activity, particularly given the notion that we cannot predict the future, at least beyond any short, stable period, because there are too many uncertainties. The futures approach is also useful in that (1) it focuses on second and third-order impacts of new technologies/cultures, (2) it examines how these changes in particular impact temporality, the way they change how technologies schedule ourselves, moving from often essentialist questions of 'who am I?' to more provocative issues of 'when am I?', and (3) it focuses on future generations, that is, on seven generations ahead and beyond. The social thus re-enters the temporal debate.

This overview of our research frameworks may imply that our approach is a dialectical one. However, it is perhaps more appropriately described as 'polylectical' since we aim to go beyond the either/or positions of positivism towards the both/and multilateral and plural positions of new paradigm research. The aim is thus to avoid a hierarchisation of knowledge and the inevitable marginalisation of the 'softer' qualitative approaches to research.

The multiple perspectives we are using in our research work are now outlined in more detail.

SYSTEMIC ISSUES

A critical futures approach

This approach allows a reconceptualisation of the future based on what is possible and desirable in the so-called 'information age'. However, this view is not synonymous with prediction but uses foresight to protect us from making errors and suffering undesirable consequences.[18]

Critical poststructuralists have highlighted the socially constructed nature of knowledge and this suggests that forecasting and planning can be changed through challenging taken-for-granted ideas. As Inayatullah has pointed out elsewhere, the information used in planning is often employed to justify a decision which has already been reached because of political pressures.[19] Thus, while information is seen as transparent by planners, embedded in it is gender, culture and civilisation. However, while thinking about the future is a necessary criterion for better decision making, it is not sufficient. For example, fascists also imagine and create long term plans to realise their preferred vision. But they use exclusive categories, visioning more of one collectivity and much less of another. This implies that other moral and ethical factors must be considered in future visioning work. A critical approach is advocated for reinventing a future for C&IT in Australia since it allows alternative futures to more easily enter the realm of possibility.

Scenarios, ideally, should be based on contrasting social, economic and technical perspectives. The power of visioning allows people to compare scenarios and work backwards from a chosen future vision. Polak's work showed how important the influence of future visions can be on the present.[20] Moreover, scenarios are not only useful because they help us make more informed decisions but because they create a distance from the present. This allows the present to become less rigid, thus allowing social and political transformation.

While visioning is a speculative activity, it offers a distinct advantage over prediction which is based in extrapolation from empirical data alone. Visioning allows individuals and organisations to move outside their institutional frameworks, and habits, especially when constructing an ideal or preferred scenario. In such a way, it is possible, especially if visioning a generation or more ahead, to work backwards from a future which is not inhibited by current institutional thinking in order to make choices. This is especially so when faced with a range of alternative visions or scenarios. Such a process allows a re-imagination of the future and the opportunity to work backwards from new ideas and to put in place, today, appropriate actions for change beyond stubborn institutional barriers.

A co-evolutionary futures perspective

We can view C&IT from at least two future perspectives: an extrapolation from the industrial era or a transformation into the information age. In our study of possible future applications for digital video communications (DVC) in Australia, we contrasted the dominant competitive industrial paradigm based on mechanistic thinking with a new holistic, integrative reconceptualisation of the world based on new paradigm science and the collaborative and social justice frameworks used by social movements such as the environmental and women's movements.[21]

These two scenarios were informed by the work of Allen, who contrasts two ways of looking at evolution: equilibrium models, deriving from a static Newtonian world view, and the coevolutionary model.[22] The equilibrium concept is seen as unsatisfactory for anticipating the future with its dimensions of evolution, instability and change. Allen proposes that structural instability and evolutionary change are more legitimately expressed in models of complex systems described by nonlinear dynamics. The coevolutionary model emphasises how human values and actions affect future system outcomes and how future strategies can be derived. Allen uses both mathematical models and qualitative methods in his work.

This coevolutionary approach is rarely taken in technology assessments which generally use 'objective' empirical methods to predict trends and events. This new approach aims to create self-organising, self-renewing systems based on synergy and assumes that actions taken now can influence which alternative futures will eventuate. The aim is to intervene in the local context before technologies are introduced to avoid reacting to global market forces and other external pressures.

An information economics perspective

More technical in its orientation (and taking a less critical approach), an information economics perspective treats information explicitly as a commodity and seeks to bring within the economic calculation the value and cost of information. This perspective may be more consistent with the reality of a rapidly emerging 'information age' than those of conventional views. As information activities grow in importance, it is likely that the economic characteristics of information will increasingly influence economic activity and the nature of institutions governing it. This approach may thus have considerable efficacy for analysing communication issues.

When the Centre was commissioned by the Australian Coalition of Service Industries, Telecom Australia, and the (then) Department of Industry, Technology and Commerce, to investigate policy issues and service industry opportunities for Australia in DVC,[23] the information economics perspective provided a useful one for examining this innovation in the service sector. Since the service sector engages in relatively less research and development compared with other sectors, conventional approaches tend to overlook it as a source of innovation. In contrast, information economics regards innovation as a broad informational process of which the production of information via R&D is only a part.[24] Thus in the DVC study, we suggested that many service industries are innovating via a process of adoption and

adaptation - adopting C&IT and adapting it to produce new products and services such as Bankcard and EFTPOS. This perspective enabled us to document and map potential DVC applications right across the entire services sector.

SOCIAL AND CULTURAL ISSUES

While the literature on the socio-cultural impacts of technology is growing, economic, technical and policy issues have in the past tended to dominate. This is often due to the difficulty in anticipating social impacts, since technology is both a social and a political process.[25]

We believe that the equity, gender and cultural issues arising from the design and use of technology are important issues. These issues include the need to involve women and disenfranchised groups such as rural and indigenous people in the development and implementation of technologies and to ensure they have equal access to technologies, and the problem of cultural dominance. Cultural, social and gender sensitivity is critical to the successful use of technology in the process of social change.

An important issue is that particular definitions of information become universal: what is considered information or data itself is being contested, and seen as based on a particular view of the world. This is far more important than the information rich/poor debate which has tended to be the dominant one. Problems of exclusion arise when certain types of information become more valued than others (Western science rather than indigenous local knowledge, male-dominated science rather than women's knowledge). An even more critical issue is how information systems come to be seen as neutral. Sardar has shown in his analysis of information systems that they continue to frame themselves in Western categories.[26] For example, in Islam there is no division between art and science (as chaos theory has recently discovered).

How theory informs analysis of cultural and social issues

Studies of new communication technologies from social and cultural perspectives have emerged from various social science traditions and therefore are quite disparate. There are many theories and much research often conducted in isolation which address different parts of the social, cultural and technological interplay. Mapping of this domain is therefore helpful.[27]

Figures 1 - 3 depict in chronological order three phases of a new technology. Figure 1 shows the key ingredients pre-technology. At this point certain individuals and groups of people in cultural contexts have not yet engaged with the new communication technology. Nevertheless the technology has been through a design process which has encoded it with certain assumptions and ideologies even before it has been marketed. This cultural encoding of technology has been an important concern of many studies.[28]

Figure 1:
Pre-Appropriation
of Technology

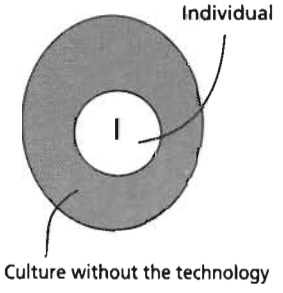
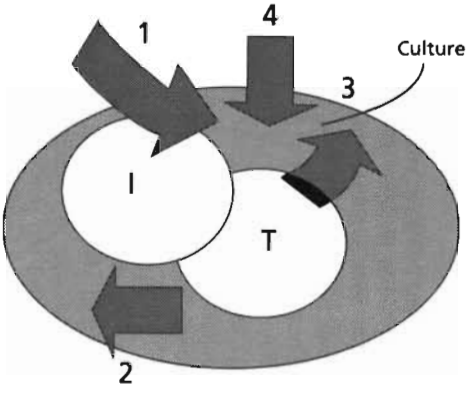
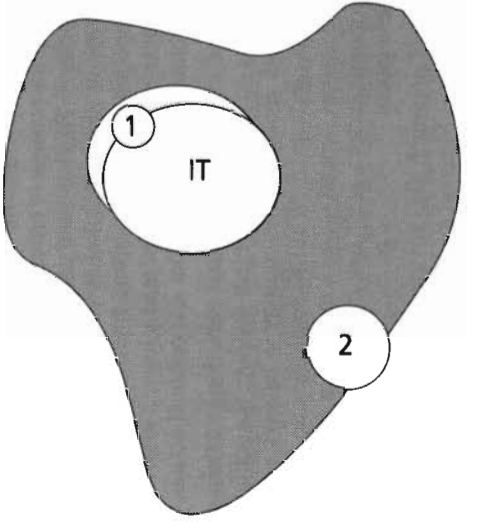


Figure 2:
Appropriation of Technology



1. Cultural context shapes use of technology via individual perceptions.
2. Technology influences individual.
3. Technology influences culture.
4. This then influences the interaction of individuals and Technology.

Figure 3:
Post Appropriation of Technology



1. Individual and technology fused into new entity.
2. New cultural context has evolved because of technology.

A Model of Technology and Culture

Figure 2 shows early appropriation of the technology and indicates important influence patterns that have been examined in the literature in disparate ways. Firstly, the social and cultural context of users informs their understanding, use of, and access to the new technology.[29] At the same time, the technology via its informational characteristics,[30] its symbolic features, its psychological holding power',[31] its level of interactivity,[32] and its ability to convey social presence' begins to influence those adopting it.[33] As well, the diffusion of a technology within a culture has longer term influences which begin to affect the cultural context of those using the technology.[34]

Of course, in addition to these characteristics of the technology are the encoded cultural components of the technology which also are influential for individuals and the appropriating cultures. In Figure 3, which depicts a mature technology, the technological artefacts and the users have become, in a sense, a fused entity,[35] resulting from the complex of intersecting forces in Figure 2. In addition, the long cycle influence of the technology in the culture has changed the cultural context that this new entity exists in and the cultural context continues to construct the evolving human/technology interface.[36]

Our research approach is problem driven and theory informed rather than theory driven and problem informed. Our projects therefore draw on, in an intersecting and dynamic way, many aspects of these literatures. For example, we would argue that rather than the effects of C&IT being seen in terms of push or pull, there is a complex, reciprocal and often paradoxical relationship between technological change and social change which needs to be taken into account.[37]

Two themes of our research may help illustrate how theory helps inform the analysis of social and cultural issues in new communication technology. These themes are gender and C&IT and the appropriation of new C&IT.

GENDER AND C&IT

The work of Mackay and Gillespie, Mackenzie and Wajcman, and Wajcman is useful in illustrating the process of encoding social, cultural and political processes into new technologies.[38] This has been particularly relevant to feminist critiques of the gendered nature of new technologies undertaken by Centre researcher June Lennie.[39] The implications of this approach are that, since political choices are embedded in the design and selection of technology, it follows that technology and its context can be changed through social and political action.

In contrast to the dominant deterministic view that technology is neutral and that the work technicians do is simply problem-solving, the social shaping of technology (SST) framework insists that technology is 'always a form of *social* knowledge, practices and products'.[40] While technologies do have impacts on society, these impacts are seen as depending on a number of complex, interrelated social, political and economic factors, including the values and ideologies of technology designers and developers.

Although the SST approach has provided useful insights, Mackay and Gillespie argue that, owing to their focus on macro perspectives, sociologists of technology

'have accorded an insufficiently central place to the role of ideology as a social force (whether macro or micro) behind the technology', and have not taken account of the appropriation of technologies by users.[41] For example, while studies such as those by Wilson, Wright, and Wajcman show that patriarchal ideologies permeate many technologies,[42] research such as Moyal's study of women and the telephone demonstrates how women can successfully appropriate technology to carry out their gender work of building and maintaining relationships.[43]

Research into the social implications of new communication technologies has largely ignored or marginalised the question of gender, power and civilisational relations. However, feminist scholarship shows how the gendered nature of science and technology operates to exclude or devalue the values of care and connection associated with the 'feminine', and women's knowledge and needs from the design of technologies.[44] From this perspective, technology is considered a powerful means of constructing and maintaining gender differences and hierarchies, and is seen as a form of social knowledge, practices and products. This view suggests that we need to take account of the role of civilisational, cultural beliefs and ideologies, as well as factors such as access and equity issues, in the development and appropriation of new C&IT, when making decisions about communication futures in Australia.

Feminists and others are deconstructing myths about gender and technology, challenging and redefining dominant views of reality and reinterpreting history, science and technology and its associated discourses, from a gender perspective. They are constructing this new scholarship using a variety of critical and radical perspectives such as ecofeminism, poststructuralism and the SST approach. However, to counter the frequently deterministic view of technology in much feminist writing, and its tendency to construct women as victims, research in this area by Lennie has considered instances where women have successfully appropriated or been involved with designing and using new communication technologies.[45]

Our research in this field has developed strategies for empowering women in assessing new C&IT and actively participating in design and implementation decision-making.[46] While there are still certain barriers to the equitable participation of women in these activities, when women can effectively influence the design and reinvention of C&IT, they have been found to use them more, and are often empowered by this experience.[47]

Feminist poststructuralist approaches to technology

Feminist deconstructions have shown how false dichotomies have been created in which men and the West are identified with objectivity and culture — the public domain of science and technology — while women and the Other are linked with subjectivity and nature — the private domain. From a feminist poststructuralist perspective, these dichotomies replicate Western male-dominated ways of thinking and a hierarchical view of knowledge.[48]

Feminist poststructuralist conceptions of gender as a particular socially constructed discourse allows a more complex analysis of gender and technology which takes

specific structural, historical and cultural contexts into account, along with the subjective meanings people give to technologies. This implies a need to break free of linear and dichotomous thinking when analysing technology issues; and to consider these issues in a way which challenges modernist and patriarchal discourses which embody values such as individualism, rationality and dominator models of social relationships and institutions. The aim is to consider the alternative possibilities arising from feminist frameworks. Feminist methodologies also acknowledges the differences between, and the diversity of participants in research into C&IT. Differences such as gender, educational backgrounds, ethnicity, race, age and geographical location are considered to avoid perpetuating exclusions and essentialist conceptions of women's experiences and needs.

Gender differences in an assessment of interactive C&IT

A small scale study which drew on recent feminist theories and feminist technology assessment methodologies was conducted which found gender differences in an assessment of the proposed use of multimedia systems to involve the community in sustainable development planning.[49] Analysis of focus group discussions with community members (one mixed gender and one all-women) revealed complex and contradictory discourses about new communication technologies, scientists and others. Some evidence was obtained that the all-women group was a more fruitful strategy for exploring these issues compared with the mixed gender group.

While some counter patterns were detected, the male participants tended to use a discourse based on hierarchical divisions between scientific 'experts' and 'non-expert' community members who often found scientific information inaccessible. In contrast, the women participants were more oriented towards broader social issues such as equity of access, and the need to use a range of communication media to reach a diversity of people. The women also suggested some creative ideas to address these issues.

This study highlighted the value of the 'ethic of care' perspective[50] which women more often bring to technology assessments and their role in facilitating a more socially just, sustainable and democratic future. A subsequent, more detailed, discourse analysis of the same focus group discussions, which were largely concerned with an evaluation of a community consultation process, came to a similar conclusion.[51]

APPROPRIATION AND DEVELOPMENT OF NEW C&IT

Other Centre research is concerned with the processes involved in adopting technologies, using Giddens' structurational view of social change.[52]

PhD research is being conducted to investigate the use of videoconferencing for government service delivery.[53] The structurational approach has proved useful in describing the subtle interplay of organisational structures, personal resources and technologies required for successful adoption of videoconferencing. In particular, Towers' work has pointed to a process which he has called 'conceptualisation of the innovation'. This is a process which is adopted more or less successfully by

different organisations but seems to be pivotal in the adoption process. Successful conceptualisations build on the trajectory of organisational understanding of how the technology should be used in the organisation. They enable users to make sense of the new technology. For example, while a correctional agency finds videoconferencing a natural extension of formal legal performances, an educational agency finds that this technology does not always translate normal classroom communication processes very well.

Another PhD study is examining cross cultural differences in the appropriation of electronic mail (email) and other communication technologies.[54] Comparative samples are contrasting Malaysian, Philippine, Australian Aboriginal and New Zealand high school users who are participating in an international educational network of schools involved in a futures project. The notion of appropriation has proved to be useful as a way of describing peoples' developing understanding, identification and routinisation of the use of the new technologies. A key issue here is the extent to which the technology itself is a structurational force imposing a universalistic communication process as opposed to the extent to which different cultures use the technology in idiosyncratic cultural ways.

Centre research has also developed new forms of educational technology. A Master of Arts unit in futures studies has been established on the World Wide Web through a joint program with Southern Cross University in northern New South Wales. This unit in theories, methods, issues and visions of the future is unique in that it will allow distance students in Australia and overseas to interact via email with other students, the lecturer, the editor of the 'textbook' and with individual authors themselves. In addition to the formal text, the unit uses photographs of authors, and graphics, as well as personal stories from the authors on audio. This creates possibilities for dynamic new levels of interaction across vast conceptual geographic distances. In addition, students will be actively involved in the unit construction and learning process with their final papers in the first year becoming part of the unit in the next year.

FUTURE SCENARIOS FOR COMMUNICATION IN AUSTRALIA

As can be seen, the multiple perspectives approach allows a diverse range of issues to be considered. We believe that analyses of emerging C&IT need to embrace this complexity. This allows the development of holistic scenarios which do justice to the complexities of issues surrounding C&IT.

Since 1988 the Centre has made several anticipatory studies of the futures of human communication. Some have been global[55] and some have specifically referred to Australia.[56] This work, while speculative, is derived from our analysis of trends and the cross-currents of change which are coming at us from the future.[57]

One of the trends which is emerging, it seems to us, is the acceptance of cooperative, positive-sum activity, compared to the zero-sum dimensions of modern competition where competition seeks to destroy the competitors. To understand the emergence of cooperation, it is helpful to study the rise of environmental concern as a public issue. Back before the start of World War II, ecology and environment were evident, although not widely, in the scientific literature. It was not until the

publication of Rachel Carson's *Silent Spring* (1965) and Barry Commoner's *The Closing Circle* (1972) that the esoteric concern for ecology emerged from specialist discussion to enter the public debate, and it was even later, in the 1970s, that it became a hot topic in the mass media.[58] In a similar fashion, we believe that cooperation, as an alternative to the conflict of competition, is about to emerge from specialist interest to become more openly debated in public, and eventually to attract the attention of the mass media.

This emergence will be heightened when we more publicly realise what Abu-Lughod calls the paradoxical effects of communication 'revolutions'.[59] She maintains that new communications technologies increase the range of possible coordination and the potential for greater social equality while, at the same time, increase actual power differentials within and between societies. This effect happened with printing. In other words, the emerging C&IT have the potential to simultaneously further centralise social control and to further empower by extending autonomy. The telecommunications giants could bypass civil world governance even more while also giving the opportunity for local communities to govern themselves and coordinate globally through networking.

In response to such issues we have developed some future scenarios. Cooperative activity is at the heart of the one of the visions for the future that we have proposed and which we called the Communicative Age.[60] The Communicative Age is a vision for the future, about a generation or so from now, that presents a stark contrast to the futures we described as the Conventional Age and the Artificial Age.

The Conventional Age emphasises technological determinism, rationality, individualism and conflict, through competition, while the Communicative Age emphasises holistic, human-centred activities and community development through the negotiation of meaning, critical reflection, cooperation and individuation. The Artificial Age sees society as totally driven by science and technology, resulting in dehumanisation and a transformation of nature.

Conventional Age people would see new technologies as extensions of existing technologies rather than as transformations, while Communicative Age people would use new technologies to actively transform society by facilitating participative democracy and the global sharing of information and resources.

In terms of gender relations, the current patriarchal structure of society would continue in the Conventional Age while feminist perspectives would gain legitimacy in the Communicative Age leading to the restructuring of gender relations towards the equitable participation by women and men, acknowledging all their diversity and difference, in every aspect of public and private life. In the Artificial Age women could become redundant in their role as child-bearers as genetic engineering takes over reproduction and potentially facilitates control of population growth.

The Communicative Age is the opportunity to move beyond the vision of an Australia wired to Hollywood in order to harness the emerging C&IT in the solution of our social problems rather than be driven by such technologies, for example

in the way we see new applications, such as Pay TV, now driving the development of our C&IT infrastructure in the cause of mass entertainment rather than in the cooperative negotiation of new ways of working, living and learning.

The challenge for the Centre is thus to develop alternative future scenarios for Australia beyond the superhighway. We believe that the multiple perspective approach we have adopted is a fruitful one for such a task.

CONCLUSION

There are inevitable tensions and contradictions in taking a multiple perspective approach to communication futures. However, if such research is conducted in a spirit of genuine respect, open communication and a willingness to listen to, and understand different theories and ideas, we believe this approach can provide a powerful means of analysing and understanding the many complex issues in this area which have implications for Australia's future.

The different frameworks we draw on allow an analysis of the interplay of culture and new C&IT and information economics and new C&IT. When taken as a whole, these disparate theories and studies point to a complex interrelationship between communication and culture. By drawing on a range of theories and methodologies, greater insights are achieved and the false boundaries and animosities between disciplines are broken down to some extent. Our action-oriented approach seeks involvement and input not only from 'experts' but also from people in the community, and others outside the traditional 'expert' category.

Thus the different perspectives, knowledge and needs of a range of current and potential users of new technologies are considered and information is generated to develop more equitable policies and technology design. Different definitions of concepts such as 'information' need to be taken into account to avoid the dominance of one particular world view. The different, and sometimes empowering ways in which people appropriate C&IT also needs to be considered to counter approaches which construct users as victims of an all-powerful technology which they are helpless to change.

The approaches we use acknowledge diversity and difference, bringing in new voices such as the ecological, the feminist and the civilisational, while avoiding the dominance of the technological or the economic. The goal is to go beyond 'either/or' thinking towards a 'both/and' perspective, meaning we need not choose a single approach in which to conduct our research and learning of the world. This approach recognises the often paradoxical relationship between technological change and social change, as well as the principles of collaboration, gender equity, and inclusion of the Other. We believe that focusing on these issues is vital to ensure that new C&IT is used in Australia for socially and ecologically beneficial purposes.

APPENDIX: A BRIEF HISTORY OF THE COMMUNICATION CENTRE'S FUTURES RESEARCH WORK

The Centre adopted the term 'communication futures' to refer to anticipatory studies of the development and diffusion of new communication technologies, including social technologies, particularly in relation to associated social and policy issues.[61] We argued that such studies should be informed by multi-disciplinary perspectives. In the intervening period we have examined and made assessments of many cases of new technologies.[62] In making these assessments there have been three important dimensions to our methodology. The first is an emphasis on social and human issues associated with the new technologies, and the second is an anticipatory and action-oriented stance. The social and human issues involved range from questions about the cultural context of the design of new technologies through to social impacts of the defused technology.

The Communication Centre began work on communication futures in 1988 when we organised a symposium entitled *Australia's Communication Futures* which brought together leading thinkers from Australia and overseas to consider the future social, economic and policy implications for communications in Australia. The symposium was held on the eve of the Australian government's announcement that it would partially deregulate the telecommunications industry. This symposium provided a context for discussing Australia's social communication needs and how technologies could be used to communicate more effectively in the future.

A book based on some of papers from this symposium and other related papers was later published by the Centre.[63] Chapters in the book were contributed by communication researchers, policy advisers, futurists, political scientists, economists and technical experts. The book considers issues such as the problem of access to information, opportunities for cooperation through intelligent networks, and the need to frame a national communications and information policy. Alternative ways of looking at the future are also outlined. Economic, technical and policy issues are considered, including the impact of convergence and the opportunities from divergence of communications; and the introduction of Pay TV and broadband integrated services networks (B-ISDN).

In 1992, the Centre was funded by the then Department of Industry, Technology and Commerce (DITAC), on behalf of the Australian Coalition of Service Industries (ACSI) and the then Telecom Australia, to conduct a scoping study on the public policy issues and service industries opportunities for Australia in digital video communications (DVC).[64] Because of its digital format, along with the introduction of B-ISDN, which enables a quantum leap in convergence possibilities, it was anticipated that DVC would become a key information technology during the next decade.

A global, cross-industry and futures-oriented view was adopted in this study which argued that the challenge of DVC was not a technological one, but concerned how this technology could be used for socially beneficial purposes and in socially equitable ways. Australia's opportunities were seen as lying in software and service industries applications. Building on research commissioned for this project, two likely future scenarios for Australia's use of DVC were developed and

their implications discussed.[65] These future scenarios were labelled the 'Conventional Age ' a technology-driven future based on consumerism and economic rationalism, and the 'Communicative Age' ' an interactive, co-evolutionary future based on social concerns and grounded in ecologically sustainable systems.

The Centre was funded by Telecom Australia in 1992 to conduct an action research project which considered the social and policy implications of intelligent networks for a range of industry and community user groups.[66] Another Telecom-funded project, which has generated a great deal of interest, looked at the likely impacts of the shifting new media infrastructure on the consumer economy.[67] Other relevant projects include the development of future scenarios for distance education and training in Australia,[68] and for Australia's virtual participation in the 2000 Sydney Olympics,[69] and the construction of three alternative futures scenarios for social, economic and political structures during the next 20–30 years and beyond.[70] Women's assessment and use of C&IT for social change and community development purposes, and the contribution of these activities to the emergence of a more cooperative, socially just and sustainable future has also been researched.[71]

Centre Director Tony Stevenson, who is also Secretary General of the World Futures Studies Federation, has taken part in the Communication Futures Issues Group, a loose grouping of academics and others which has developed alternative future scenarios for Australia related to the introduction of a broadband telecommunications network, and aims to foster public debate on these issues.

Centre researchers have also provided input into reports by the Broadband Services Expert Group (BSEG). BSEG was formed in 1993 to assess the potential demand for broadband services to homes, businesses and schools in Australia five, ten and fifteen years hence (BSEG, 1994). Research work included the development of demand scenarios for broadband services for the health sector and for telecommuting in Australia.[72] The outcomes of some of these projects are outlined in more detail later in this paper.

In 1994, a leading futures theorist, Dr Sohail Inayatullah, joined the Centre as a Postdoctoral Fellow. He has been involved in establishing and teaching futures courses in the Asia-Pacific region and has brought an alternative non-Western, civilisational and critical futures studies perspective to the Centre's research in this area.

Centre researchers and postgraduate students currently work on four broad, futures-oriented programs which focus on the design of social technologies such as computer-mediated community consultation. These are:

- Global Communication Futures
- Communication Futures in the East Asian Telecommunity
- Local/Global Netweaving: Interconnecting Local Communities Globally
- Research and Development of Social and Organisational Innovations

In summary, the Centre has continued to develop and expand its thinking and research work in the area of communication futures in Australia over the past seven years in directions which aim to challenge conventional conceptions both of new

communications technologies and the methodologies used to research this area. Our research has identified broad principles for policy design. It has made inputs to Federal government communications policies, particularly in the area of digital communication systems, and has informed the strategic planning of key organisations such as Telecom Australia.

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