COMPUTER USERS AS MEDIA AUDIENCES*

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This paper draws attention to the changing nature of the range of experiences people currently engage in as computer users. It is argued that computer-based technology is a medium of communication, following similar patterns of development to other media, and employing specific codes of representation and presentation to construct images of the world. It is suggested that the development of increasingly user-friendly programs simultaneously increases access to the medium while distancing users from control of the means to program images. The term computer is used to mean computer-based technology, and the term computer program for the delivered experience of the hardware and software.

Keywords: computers, media audiences, communication, mediating technologies

MACHINE OR MEDIUM

Computers as machines

Computers are essentially a control technology, a technology for processing information. The efficient, accurate and predictable flow of information they are able to provide promotes a stabilisation of the systems to which they are applied. Since the Second World War computers have been applied to processing and managing information in a wide variety of applications. They have been introduced to support most of the financial and mass media industries, as well as corporate and government information systems. Computers have become an essential part of daily life. Such computer applications (the construction of payrolls, control of traffic lights, construction of radio playlists, etc.) have changed the forms in which people experience their environment. Yet people are generally unaware of the extent of such change because it has been integrated into familiar contexts.

The role played by computers in these familiar contexts is usually instrumental. Computers are experienced as machines which expedite work or other forms of media production; more as a means of

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efficiently controlling the chaotic nature of the external world, than as providing representations or reflections of it; as the equivalents of typewriters, filing cabinets or musical instruments. Until recently the personal experience of computers as a medium of communication was remote for most people because computer modes of representation have been incorporated into or carried by other media forms. Awareness of the ways in which computers are used to construct representations or images of the world has been confined to the programmers-technicians developing applications for the machine. The whole paradigm of computer applications development has been to simulate existing systems for handling information and to replace them with computer-based systems; to represent existing systems for getting work done as computer-based information systems.

Micro-electronics and the new medium

Over the past decade developments in microelectronics have dramatically reduced the cost of computing through miniaturisation of the components. Microelectronic technology has created the possibility for large numbers of people to directly experience the potential of computers as media of communication. The economies of scale and costs have enabled computer technology to be introduced on a personal level. Microprocessors have made it possible for people not only to experience the technology on this small scale, but also to experience the availability and accessibility of large scale applications. An idea of the scale of computer use in Australia can be taken from the International Data Corporation's 1985 estimates of computer system shipments. In 1982 25,000 personal computers had been sold in Australia. It is estimated that by 1990 2,233,600 personal computers will have been sold here, and that the number of large scale systems operating here will have risen from 35 to 672.[1] These figures represent independent computer systems, not microcomputers embedded in other machines. Mass media industries, in particular, have been highly penetrated by computer-based technologies.

Machine or medium

An interesting difference between the experience of the computer as machine/tool and the computer as medium is the involvement of people as users in text-writing activities. Computer programs are the texts which characterise the computer age. They are still relatively new to our society and culture. Programmers have had a privileged position in their development, and knowledge of the codes and conventions needed for their creation is still not widely shared. It is only recently that large numbers of users have begun to explore the activity of writing programs. The dominant activity on home

computers has been the creation of programming texts. Users have been encouraged to write their own games programs, teaching programs, and work application programs. The move from machine to medium experiences of computers had facilitated the spread of computer media competencies to a wider audience than the elite of programming technicians of the past. It has facilitated the introduction of teaching about computers in schools. It has also introduced a new set of criteria for the development of programming languages and program production because of the involvement of people more in touch with popular culture.

A Handybank transaction, for example, requires users to participate in the system of representation used in a manner which creates the transaction as text. Users select the desired transaction and write the 'program' for the interaction. Widespread user competence in such simple programming tasks is essential for the commercial and technological development of the medium.

Creating a mass audience

The importance of the direct experience phase of mass audience creation should not be underestimated. It is a phase during which the secrets of the formerly esoteric world of programming are offered up for public scrutiny, not primarily so that people can understand them better but so that the potential of people as consumers of the new medium and its products can be assessed.

With the proliferation of direct experiences of computers, the necessary and deliberate phase of mass audience creation for the new medium has begun. The pattern of this development is following that of film, radio, and television. Over the last few years the expansion of popular interest in computers as a medium of communication has parallelled the early interest of radio enthusiasts in creating their own crystal sets. Most newsagents currently stock a wide range of computer user magazines and journals: evidence of well-established user-groups and a community able to participate in the computer-culture. The similarities with the early days of radio are again very relevant.[2] The nature and growth of video-games parlours is similar to the fascination created by the nickelodeons which introduced people to film at the turn of the century. Most significantly, the development of a mass audience for computers is following the familiar pattern of dual development of both serious and leisure applications of the medium. Through directly exposing people to as wide a range of applications as possible, the commercial potential of the new medium can be assessed.

With media such as radio and television the distinction between information and entertainment provided the basis for a mix of

programming capable of maximising both the audience and the penetration of the medium. With computers the non-entertainment applications have a work dimension which derives from the machine/tool application of the technology. These applications are usually non-personal. Where the informational work of television has degenerated into promotion (as realised in advertising), with its entertainment dimension now including news and documentary as well as drama and comedy, the informational work of computers is divided between non-personal (work) and personal (leisure) applications of the medium. The leisure applications of computers have intensified the rate of penetration of the work applications.

Where television blurs the distinction between information and entertainment in the direction of all television production being seen as entertainment, computers blur the distinction between work and leisure in the direction of all computer production being information. It makes no difference whether audiences get to know about what computers can do through work or leisure applications; it matters only that they do. Knowledge of the medium and legitimation of its forms of representation are essential for the widespread penetration of the medium.

Computers as Mass Media

The key to understanding computers as a medium of communication lies in understanding the nature of computer programs. The current direction in computer programming is towards more powerful programming languages and programs. Power, when applied to programming languages, implies an ability to better encode reality, at both deep and surface levels. A powerful program is one which would enable an encoding of human modes of knowing and constructing meaning. Such programs attempt to simulate knowledge, to engage the user in intelligent interactions. Powerful programs are meant to be simple to apply and to reduce user frustration, while placing the data structures by which they represent the world beyond general scrutiny. The programming language and the program itself are designed to be transparent, so that the image on the VDU screen is taken to be reality.

The new textual possibilities

As media of mass communication computers offer audiences textual possibilities which are quite new. A computer program offers its audience an encoding of a potentially real world space, and a set of rules which determine the possible interactions within that space. Computers create a new space, and programs and programming languages provide the user with the means of naming that space, of

creating an arbitrary (i.e., symbolic) structure within it. The user is placed in an active relation to the new space and its virtually unlimited possibilities; she/he is offered an opportunity to express psychological desires for mastery, order and control, in the production of a highly structured, consistent and coherent universe of possibilities.

The work applications of computer programming have increased the likelihood that the representations of the real world which appear on the VDU screen will be considered to be reality, even though they bear an even more highly coded and less life-like similarity to it than television or film representations. The structural coherence of the symbolic worlds created by computers demand their acceptance as reality. The options open to the user are to engage with the system as constructed, to adapt her/his perception of reality to the system, or to refuse to engage with the system.

It is in this respect that the entertainment applications, in particular as video-games, have been most instrumental in encouraging users to engage with the system whether or not the picture of reality presented is acceptable. They encourage users to engage with the system in order to discover the nature of the fantasy world they present, and so set a precedent for applying the same procedure to the real world, i.e., do not question the program, just use it to see what you can find out about the world.

Computer programs as signifying practice

Computers offer an additional level of textual production to the systems of mass communication with which we are more familiar; they offer a double mediation which encourages confusion between the reality of the program and the programmed reality. Computers use two systems of signification peculiar to the medium. Programming languages are the signifying systems which allow information to be encoded. Computer programs, on the other hand, are signifying systems which represent metaphorically the systems in which users are located. Together they achieve a representation, not just of the look or sound of the external world referenced (as is the case with film, television or radio), but of the system which governs the possibilities of that world. The simulation is less in the area of realistic appearances than in that of the relationships possible between the elements of the program/text. In other words, computer programs encode not just the surface structures of the external world, but also the interrelationships between the elements of that represented world. They define not just the structure of the world they represent but also the way it works.

In using my word processing program, for example, I work with a representation of the article I shall eventually submit for publication.

The program/text represents the task/work situation in which the user is engaged; it is the situation of writing which is represented by the program. In this sense the program/text facilitates the user's creation of another text — a journal article, a spread-sheet, or even the lived text of a video-game. The text on my VDU screen can be changed in whatever way I wish, but only within the possibilites inherent in the particular word processing package which I am using. The possibilities for textual production, at the user/audience level, are determined by the data structures constructed by the programmer. The object, my journal article, exists in the form of its representation before it exists as an object. My journal article, in its final paper existence, is a reproduction of its computer image. This is an inversion of the way mechanical reproduction changed the way art is seen.[3]

The nature of the relation between the real world and its computer representations is not well understood. Leisure applications of the technology produce fantasy worlds for audiences to engage in. Serious applications provide the 'real' world for audiences to engage in. In some applications, the representation becomes the reality. In Electronic Funds Transfer there is no longer a 'real' exchange other than the computer representation of it. The computer version of the transaction is held to be accurate. This replacement of the real by a computer representation should cause concern. It is an area where the problem referred to by Jean Baudrillard,[4] of the world of referents (the object) being subordinated to its simulation, must be taken seriously. The struggle for power between computer realities and human realities is biased in the favour of computers in work applications. The world of objects is named/brought into being in its representation on the VDU screen. The signifier pre-empts the referent.

Mass production of computer programs

The development of computer technology as a medium of mass communication is bringing about a change in programming culture. In the days of the machine image of the computer, coding was achieved by a sub-culture of programmers, who appropriated organisational structures which already existed in other media forms. Their data structures replicated what already existed in paper-based form, allowing it to be stored, reproduced or transmitted more efficiently and accurately. Technicians were the core audiences for the programming languages and programs. They attempted to model the information systems and then to represent them to users. This process has often involved retraining or coercing the user to accept the programmer's sign system. There has been a shift from verbal metaphors to graphic representation (of solutions, options, outcomes)

as wider and more diverse audiences have demanded languages that can support more readable codes, codes which use familiar metaphors to create a more intuitive use of the medium. The goal of programmers/technicians is eventually to use the universal literacy of voice in computer communications; to create a non-human being.

The phase of direct audience experience of computing has simultaneously increased the computer literacy of some users and provided information to program producers about user frustrations and pleasures. The shift to codes which directly reference the everyday world in which programs are used, to codes of program production for the creation of "intuitive interfaces",[5] has created an awareness of the similarities between computer program production and other media production. Rather than the popular image of programmers/technicians individually crafting a solution to a program specification, mass production of computer programs is carried out by teams of specialists such as editors, directors, writers, graphics designers, etc. In such a production team programmers are in the minority.

In terms of the mass production and distribution of media products, the marketing of program packages threatens little disruption to the pattern which has been established across the whole mass communication industry. Computer programs take their place alongside video-cassettes, audio-tape recordings, phonograph records. They are mass produced packages. Production is carried out by an elite production industry. Distribution is carried out by a small number of multinational companies. And the audience is placed in a relation to the means of cultural production which ensures that production is not an expression of an audience as community, but of the particular reflections of the producer/director of the package. An audience psychology, the psychology of the user/consumer, is written into the conventions of 'good' computer program development.

THE PSYCHOLOGY OF COMPUTER USE

Psychomotor behaviour

Each medium of mass communication privileges a range of activities which involve the audience in psychologically significant situations. The modes of representation of media such as photography, film and television exploit techniques of visual perception to stimulate the imagination and promote involvement in their cultural production. The psychology of computer use is quite different from that of other media.

Computers support an electronic environment where interaction occurs. Users/audiences react to the imperatives of these time and

space interfaces in characteristic ways. The acquisition of computer skills requires the mastery of psychomotor behaviours appropriate to the task at hand. Sets of such skills are most obvious when people play video-games. The matching of vision and movement are crucial for mastery of the game. Psychomotor reactions are called into being by the desire to master the set of tasks required to play the game to the end. The pace set by the program and the reaction speeds required for mastery build in "neurological and cardio-vascular kicks" to the experience of the game.[6] The patterns of waiting and reacting, passivity and action, create psysiological dimensions of experience closer to those experienced in music and dance than to television and film. The rhythms and repetitive patterns of orchestrated motor behaviours keep the user involved and help to get things done.

While psychomotor behaviour during video-game encounters is patterned into phases of action and inaction, and is relatively bounded in time, the pace of work applications is usually more consistent and relentless, offering fewer highs and lows of excitement and lacking in time boundaries. Being locked into a consistently fast moving pattern of psychomotor behaviour for long periods at work can be extremely tiring and emotionally exhausting. Demanding that users work more slowly or take more rests is likely to reduce the neurological and cardio-vascular highs, the physiological pleasures of using the technology. It is not surprising that using high speed electronic representations of work results in high human health costs.[7]

Computers and the desire for mastery

The computer medium offers possibilities for the indulgence of the desire for mastery which are unique in a mass medium. Successful interaction with the medium can facilitate the definition of self and social identity.[8] The dark side of the medium is characterised by excessive preoccupation with computers (or a particular program) to the exclusion or neglect of all else (obsession), and by the irrepressible urge to repeat, continue or resume the interaction (compulsion). Obsessive/compulsive tendencies are encouraged by the necessity for order, neatness and control essential for the construction and operation of computer programs.

The interaction with an invisible other, often metaphorically represented as a ghost, a monster, an alien airship, yet not identifiable as any single element in the game, seems to encourage such obsessive/compulsive preoccupations. Sudnow provides an interesting account of his obsession with the video-game, *Breakout,* in which he chronicles his addiction to the psychomotor thrills and his obsession with deciphering the system by which the game was constructed.[9]

The desire for mastery is as much a desire to know the opponent as to control the game, as much to understand the structure of the

relationships represented as to win. Video-games suggest the possibility of knowing the unknown in a controlled and controllable form; the possibility of knowledge of more complex systems, while offering knowledge of only their own finite ones. It is in the illusion of gaining mastery over the apparently unknowable, of imposing order on chaos, that the psychological power of computers lies. Work applications offer control over real world rather than fantasy systems. Mountains of paper are reduced to the dimensions of a floppy disc. The office system can become completely controllable.

Styles of mastery

Turkle claims to have observed two different styles of approaching elementary programming tasks among young children. "Hard mastery is the mastery of the planner, the engineer; soft mastery is the mastery of the artist: try this, wait for a response, try something else, let the overall shape emerge from an interaction with the medium".[10] As she mentions, not all computer languages facilitate the expression of different programming styles, since the basic computer culture from which such languages derive is based in obsessive/compulsive personality characteristics which privilege attempts to impose a plan on external reality, to control it. Computer programs must by nature impose a regime of control, and include very little room for experimentation and play. The psychology of the audience currently encoded in computer languages and programs offers a reflection of the preoccupations and concerns, of the shared personality traits of the sub-culture of technicians responsible for the development of the medium, in interaction with the rigours of the technology.

The future of computers as a new medium of mass communication depends on more than the familiarisation of audiences with the conventions for using the technology. It requires the writing-in to the medium of more opportunities for "soft mastery". The development of computer languages and programs which "anticipate problems in the user's defensiveness", "communicate from empathy instead of superiority" and "support the problem solving process"[11] are essential. In other words, the future of the computer as a mass medium depends on the development of production codes which make allowance for personality and cultural differences in the way programs are perceived and used. It requires computer languages and programs which provide more avenues of identification for users with the program and its aims, and a broader range of audience psychologies written into the conventions of production. In the areas of entertainment and educational software, many of the popular mass produced programs have been developed not by the technician culture, but by self-taught programmers who have brought a broader range of cultural experiences and style to the task.

Textual space, creative imagination and projection

In discussing the psychology of the film audience, Elsaesser has suggested that the psychomotor inhibition of the situation of watching encourages audience identification with and projection onto, the dramatic world portrayed. "A film not only immerses and absorbs an audience into its world, there is also a countercurrent where the spectator immerses the film into his (psychic) world, brought to the threshhold of consciousness by the energy emanating from the viewing situation itself."[12] In offering a new and impermanent space for the production of texts, computers offer audiences the opportunity to create textual structures within the limits defined by a program or programming language. The opportunity for projection of aspects of the user's psychic world into the new space created by computers is very real indeed. Yet with computers the projection is less the product of voyeurism, than a reflection of psychological preferences for ways of ordering and manipulating space and environments. The nature of the technological potential of the medium is such that programmers strive to create their ideal others and ideal environments within computer space, where their dreams can possess a reality never before possible. Computers also allow audiences to identify with constructed characters or objects, but less through perceived similarities of look than through similarities of desire (to escape, to win, to get the work done, to outwit the opponent, etc.). The computer offers people very different avenues for exploring and resolving the dilemmas of the psychic world.

IDENTIFYING THE POWER GAME

Borrowing conventions for good program production

The recognition of the importance of the psychomotor pace sustained by a computer program in establishing audience/user attitudes to the medium, the recognition of differing user styles of mastery in orientations to computers, the incorporation of the rhetoric and experience of mastery into the design of computer programs, are all contributing to the definition of conventions for addressing and sustaining the intellectual and psychological interest of audiences in computers. Moreover, technician/programmers are being encouraged to borrow conventions for addressing audiences from the communication expertise of other mass media such as film.[13]

Producing software that is accessible to mass audiences is usually talked about as developing user-friendly programs that are more transparent, and diminishing the user's awareness of the program. Ultimately, however, it involves "influencing users to modify their perceptions of reality to agree with the computer's view of reality",[14]

just like other mass media. While user-friendly software is easy to use and to market, it manages to exclude audiences further from the arena of program production.

Increasing access and losing control

While the development of computers as a medium of mass communication is dramatically increasing the accessibility of the technology to users, it is happening at the cost to most users of any hope of understanding the coding conventions used to produce such programs. Mass audiences are not being incorporated into the production system at the level of program construction. Success in the production of user-friendly software can be expected to reduce even the current amount of audience/user involvement in the writing of programs. With television, radio and film, audiences are similarly disenfranchised from production.

The demand for public access within the broadcast media is continually frustrated by the rejection of independent production because it is said to be amateurish, or not of broadcast quality. Audience access is also frustrated by the difficulties audiences, who have been trained to accept professional codes of production as normal, experience in understanding media products which defy the normal production conventions. The situation is a familiar media one — gaining access to the use of the medium seems inevitably to lead to a loss of control over the means of cultural production. In modern society the representations/reflections of society which are privileged with mass distribution are inevitably based in the idiosyncratic visions of a small number of producers of "cultural capital".[15] The expression of sub-cultural style, which develops from shared experiences of communal and community life, is usually denied direct access to the mass media. Instead mediated versions of the expression of sub-cultural experience are propagated by the media (as stereotyping, biased representation, etc.). The electronic environment provided by mass produced program packages promises the audience a match with the environment in which the program is to be used, or at least that the program can profitably be imposed on that environment.

The manifestation of the technology of computers in the form of mass produced programs is the area most accessible to mass audiences, as well as the arena in which mass audiences are most available to the computer industry. Because of their experiences with television, video, film etc. audiences know how to understand what they are to do with computer packages. The commodity form of the product is perceived as something to buy and to use. The commodity form produces in mass audiences an expectation that the product will be easy to understand and incorporate into audience/user lifestyles.

Mastering a program versus mastering computing

As texts of the medium, mass produced packages present their electronic environment to the user in familiar terms, sometimes as iconic representations of the real, using metaphors to create areas of identification. Mastery of the environment supported by the package through identification with these metaphors has become the dominant practice in computer education. Yet mastery of a particular computer program is not the same thing as computer literacy. It is not mastery over computers. It is not even the beginning of knowledge of the medium and its forms of representation. Audiences may become familiar with the codes of representation used, but they are encouraged not to question the worldviews/data structures presented. The computer's view of reality is presented as belonging to no one and as unquestionably right.

Suppressing the radical potential of the computer medium

What Brian Winston has described as the "law of suppression of radical potential" in his analysis of the history of television is at work in the current development of computing.[16] Winston claims that the institutional development of television as a medium consistently worked to exclude any developmental options which might have disrupted the existing balance of competing interests across the field of mass communication industries. The current direction of computer audience/market structuring places users in the familiar role of consumer — a role audiences know well and have been trained not to question. It is also a role which ensures that the media industry is free to control the production and distribution of its products without interference from the audience. It is ultimately more profitable for the computer industries that the radical potential of the new medium be suppressed; that the potential of audiences to share in, and be constituted as competent to use, the conventions of production of the computer medium be subordinated to the desire for quick and profitable sales. The radical potential of computing lies not in computer use as a member of a mass audience, but in the development of programming packages and programming languages which allow greater numbers of users to design systems which represent their particular daily environments. Rather than encouraging users to impose a ready-made computer version of work or leisure environments onto their experiences, the possibilities of computing could be directed to the encouragement of more inventive and creative media products. Yet the commercial imperatives which insist on the advantage of copyrighting innovative and powerful programs, and on moving production beyond the competence of the mass of users, seem likely to suppress these radical potentials. The commercial imperative

seems currently to favour strategies which will convince audiences that the ability to control the text, the ability to operate the program is more important than possessing the power to define the possibilities of the program.

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