A Study of Audience Relationships with Interactive Computer-Based Visual Artworks in Gallery Settings, through Observation, Art Practice, and Curation.

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Submitted in partial fulfilment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

The University of Sunderland
July 1997

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Abstract of the research

Contemporary interactive computer-based artworks are examined, with particular reference to the problems and opportunities presented by their relationship to their audience in conventional gallery settings. From an anecdotal starting point, the research uses a series of observational case studies of exhibited works, the production of an interactive artwork, and the curation of an exhibition of interactive artworks, to explore pragmatic questions of the artwork/audience relationship in real-world situations.

A range of existing taxonomies for kinds and levels of interactivity within art are examined, and a 'common-language' taxonomy based on the metaphor of 'conversation' is developed and applied. The case studies reveal patterns of use of interactive artworks including the relation of use-time to gender, aspects of intimidation, and social interaction. In particular, a high frequency of collective use of artworks, even when the artworks are designed to be used by one person, is discovered.

This aspect of collective versus individual use, and interaction between audience members is further explored by several strands of research: The development of an interactive artwork specifically intended to be enhanced by collective usage and interaction between users; the application of a metaphor of 'conversation/host' to the making of the artwork; further, more specific, case studies of such artworks; and the further development of the taxonomy into a graphic form to illustrate differences in artwork-audience, and audience-audience relationships.

The strands of research work together to uncover data which would be of use to artists and curators working with computer-based interactive artworks, and explores and develops tools which may be useful for the analysis of a wide range of artworks and art production.

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Enclosures:

Serious Games Catalogue (Appendix IV).

A CD-ROM (Apple Macintosh compatible).

The CD-ROM contains an interactive multimedia version of this dissertation, including the short video clips, and colour versions of the figures where applicable.

Table of Tables:

Table of Figures:

(some of these figures can be seen in colour on the CD)

Table of Video Clips:

(these video clips can be seen on the CD only, but are referenced in the printed text)

Credits for video clips:

All video documentation of *Individual Fancies* is by the author.
Clip 2 of *Audio Zone* is taken from documentation by the artist Susan Collins.
Clip 5 of *Resonance of 4* is taken from documentation supplied by the artist Toshio Iwai.
Clips 1 and 3 are taken from documentation by Moviola/Tramway of the *V-Topia* exhibition.

List of Appendices:

Author declarations

1. During the period of registered study in which this dissertation was prepared the author has not been registered for any other academic award or qualification.

2. The material included in this dissertation has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

3. The programme of advanced study of which this dissertation is part has consisted of:

Supervision tutorials.
School of Art, Design and Communications, research students meetings.
Art Research specialist workshop (led by Dr. Anne Douglas, Gray's School of Art).
Statistical Methods for Research Students, short course.
(The above held at University of Sunderland).

Attendance at relevant research conferences (see Appendix VI).

Acknowledgements

At the University of Sunderland, grateful thanks go to:

Research supervisors Brian Thompson (whose unique knowledge of art-practice-based research helped blaze several trails), Huw Davies (now of Napier University, whose practical film and multimedia experience was invaluable), and Deborah Thomas (whose film theory informed the theoretical section of the research), for their consistently useful comments, feedback and criticism. Also Mark Erikson and Malcolm Farrow for their help and advice with statistics. On the technical side, the artwork could not have been produced without the patient and tolerant help of technical staff: Tim Betterton (ceramic drilling), Alan Flaws (advice and making the infra-red teapot version), Paul Graham (sound advice and beyond), and Ray Richardson (video projector).

Learning Development Services (in particular Suzanne Robertson and Keith Sewell) are to be thanked for their support of half of the computer, and for allowing the calm of multimedia production to be shattered by various art making shenanigans. Thanks to the actors and hand models for their ghostly presence in the artwork. In connection with exhibiting the artwork, thanks go to John Davidson, curator of the Reg Vardy Gallery, and Carol Baker, for help with observational studies.

Outside of the University of Sunderland, thanks are due to:

Hugh Malinder of Middlesex University for advice on connecting sensors; various members of my family (father, brother and Uncle Harold) for advice on infra-red sensors; Northern Arts travel grants for contributions to travel to Montreal for ISEA 95; and all funders of *Serious Games* for the travel and research afforded by that exhibition which also fed into this research. Thanks also go to the galleries who allowed observational studies: The Watershed Gallery, Bristol; The Tramway, Glasgow; The Laing Art Gallery, Newcastle. For permission to quote from privately commissioned studies and reports, thanks to the Science Museum and The Laing Art Gallery.

Last but not least special thanks to my partner David Rinehart, who schlepped, installed, proofed and otherwise suffered for my art.

Chapter 1 Introduction

1.1 General introduction

> The current romance of interactivity promises such things as being a better or more democratic art form and/or the art form of the future ... Yet interactive videodisks ... only appear to eliminate the alienation of the artist and viewer present in most avant-garde art. (Wooster, 1991, p.294).

The reasons for embarking on this research are perhaps the commonest reasons in the world: a great excitement about a subject, and a simultaneous awareness of some knotty problems which attend it. The excitement was about this brave new medium, interactive computer art, which carried with it all the thrilling potentiality for a different way of viewing art, for participation by the audience and even for full artistic input. The knotty problems were identified from attendance at several of the earliest presentations of interactive computer-based art in an 'exhibition in a gallery' form. At this point it transpired that there were some serious barriers between the potential of the artworks and the actual quality of the experience of the artwork for the audience.

Both the excitement and the problems, it was realised, were based around the interface of the artwork and the audience. Interactive art has stimulated some interesting theoretical and philosophical debates about the position of the audience, which are touched on here, but the main focus of the research is on the more practical aspects of observing and analysing audience responses in actual situations. As a curator as well as an artist, I perceived a need for some practical facts as well as the wider debate.

Included in Appendix II is a chapter on the subject of interactive art and audience written just as the research was starting, but before I had started any formal case studies of exhibitions. My identification of the broadly perceived problems at this stage are perhaps interesting as a starting point of some hypotheses which are tested during the later case studies. The perceived problems could be roughly summarised as:

A) Grand claims are made for interactive art, based on vague terms: How can we be more accurate about different types and aims of interactivity?

B) Interactive art tends often to be designed for one person. Is this necessarily an individualistic, isolating artform?

C) Many have problems interacting because of queues, lack of knowledge, lack of visual pleasure, or intimidation. How can this be addressed?

These were the very broad starting questions which the research was intended to at least partially address. The purpose of the research was not to define 'good interactive computer art', bounded as it is by many unquantifiables and 'happy accidents', but rather to discover some information which might help artists and curators to steer away from too many '*un*happy accidents' — basic mistakes which may prevent the audience from being able to engage with or even view the content of the art.

1.2 Research methods used

> To develop a strategy to theorize the products of the technoculture, we must draw from the traditions of aesthetic philosophy without holding computer-inflected media to a static and anachronistic set of 'standards' — hybrid media require hybrid analysis. (Lunenfeld, 1993, p.7).
>
> ... evolve a 'hybrid' research strategy to manage the formidable aspects of 'complexity'. (Gray and Pirie, 1995, p.7).

This research diverges from many traditional research methodologies by involving practice-based research — research formed by the live practice of making art — in this case, the making of computer-based interactive artwork.

Whilst this is a relatively new area of practice, there is a growing amount of useful published material in support, including overviews such as Gray and Pirie (1995) which traces the development of artistic research procedures from post-positivism, critical theory and constructivism, and parallels this to new scientific paradigms of complex systems and chaos theory.

Recent practice-based Ph.D. publications include Anne Douglas (1992) which analysed the nature of sculptural practice by quoting the improvisational structure of Cage's music creation, and foregrounds the challenge to 19th century linear research structures by a cyclical, holistic or network approach.

This research differs from Douglas' work, however, by forming a hybrid of practice-based research with more conventional case studies and wider taxonomies, in an attempt to deal usefully with 'hybrid media'. It shares some similarities with Stephen Bell's 1991 thesis *Participatory Art and Computers*, which also attempted taxonomy and was informed by the production of work, but is more centrally sited in contemporary Post-Modern art than in computer art *per se*. Figure 1 attempts a simplified representation of the overall structure of the research.

In addition to the introduction and conclusions, the research could be described as being in four main sections:

Chapters 2-4:
Siting some contemporary interactive computer-based artwork in a historical and critical context, exploring the development of taxonomies of kinds and levels of interactivity, and suggesting some new taxonomies where useful.

Chapters 5-6:
Case Studies of some contemporary interactive computer-based artworks with observations of particular patterns of audience interaction with the artworks. This section perhaps most closely relates to traditional scientific or social science methodologies, using observation and questionnaire, but could be described as diachronic rather than synchronic (Douglas, 1992): A progressive series of different Case Studies, with each study suggesting slightly new approaches for further studies (synchronic would involve testing one phenomenon in several different situations where only one variable is changed at a time, and is not necessarily possible with artworks in real-life situations).

Chapter 7:
The practice-based development of the selected findings of the Case Studies, through the process of the making, testing and analysis of an interactive computer-based artwork, and to a lesser extent, curating an exhibition of interactive artworks. The two strands are both informed by, and in turn inform other strands of the research, by constant feedback and reflection. The key question of individual versus collective use, and of interaction between people, is developed by these practice-based strands, and the taxonomy is tested and furthered by application.

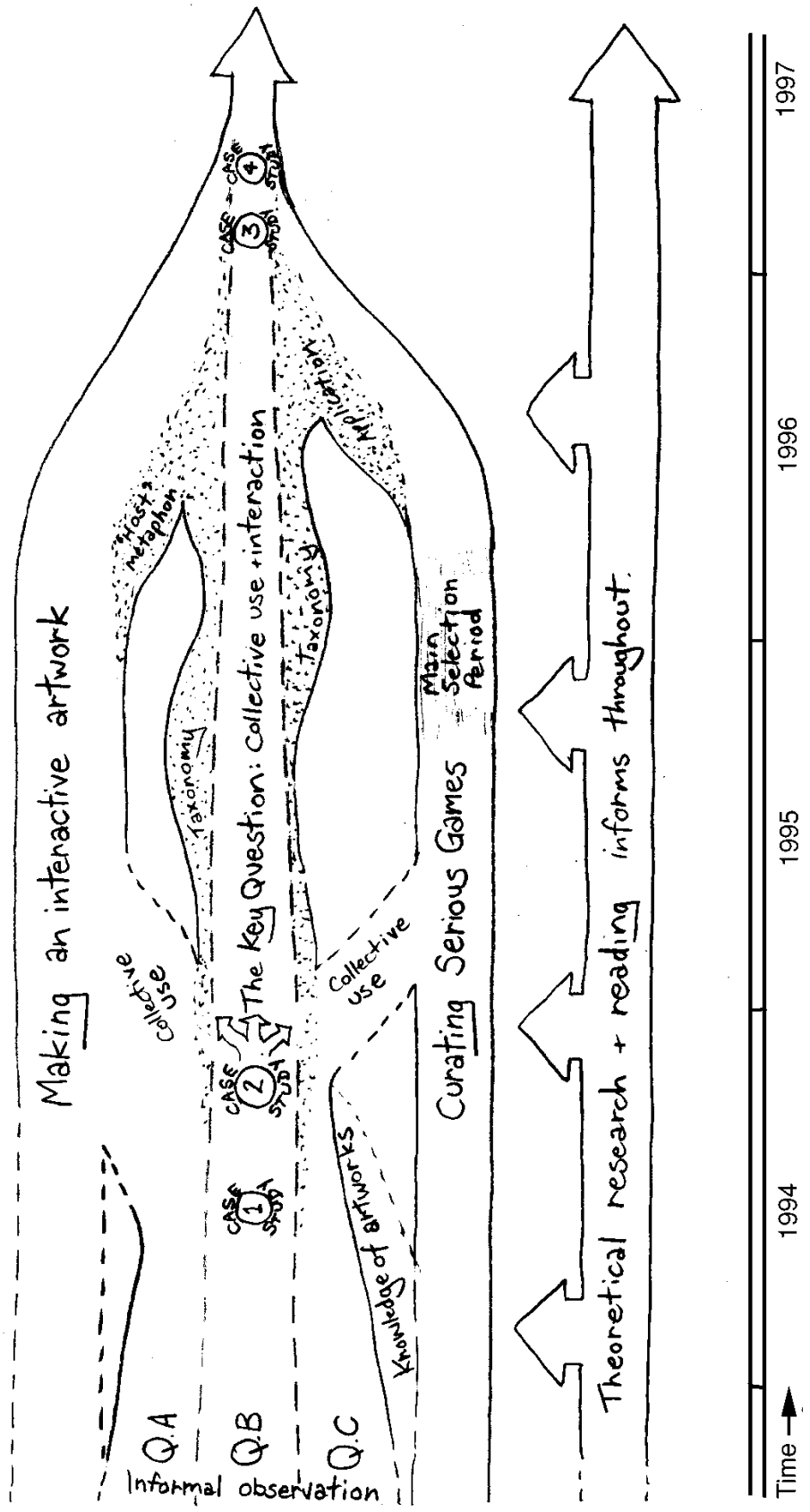


Figure 1: Simplified diagram of the strands of research

Chapters 8-9:
Further Case Studies of an artwork within the curated exhibition, and the artwork produced as research. These studies concentrate very specifically on one aspect to emerge from previous research — that of collective versus individual use of interactive artworks.

The chapter structure reflects to a certain extent the chronological order of the research, but cannot of course fully illustrate the nature of the constant feedback between research strands. Figure 1 attempts a simplified representation of the overall structure of the research. The insistence on the importance of art-practice-based research as one strand, naturally takes the research into much more dangerous and less-charted waters, but is an essential part of creating research which is *central* to new artistic practices rather than of tangential interest. The aim is to create research of hybrid vigour, as well as drawing on scientific rigour.

Chapter 2 Overview of literature and debates

2.1 Introduction

There is not a great deal of existing published material concerning interactive computer-based art, dealing as it does with new technology in new contexts. There is less 'a body of knowledge' than a loose connection of organs which may not yet have agreed the manner of creature they might be. That is, the critical values and even the common terminology for interactive computer-based art are still in development, creating a fascinating but uncertain set of debates which overlap with many adjoining areas. Each area, however, can only provide a partial analysis and needs to be 'hybridised' to fully cover the subject of interactive computer-based art.

A good deal of the literature is grey literature — theses, conference proceedings and Internet essays etc. The newer material on the Internet might be expected to provide much material concerning new technology and art, and indeed it does, but unfortunately not much of material is of good quality unless under the reliable editing of net-based publications such as *Post-Modern Culture*. Material published on the Internet is included in this overview, but much of the net-based research was more useful for locating further reading, individual artists and organisations, than for essays *per se*.

Perhaps the most useful specialist body of debate concerning interactive computer-based art has been the ISEA (International Symposia of Electronic Art) conferences, which move venue for each event, and has developed from a specialist 'computer-art' event into a event which is more in the mainstream of contemporary Post-Modern art debates. In the field of cultural studies, several recent publications (Penny, 1995; Lister, 1995; Dovey, 1996) have brought together essays by international theorists which have helped to place new technology in a wider cultural context, if not necessarily a fine art setting.

Each adjoining subject area of course tends to apply its own values and debates, and is an extensive research area in its own right. Whilst I have written in other places about the theory base of new technology (Graham, 1995, 1996), this is not the prime purpose of this dissertation. However, it may be useful to deal very briefly

with some of the major relevant issues raised by several different subject areas: they affect a public perception of technology and art, and therefore may affect how an audience may approach any such work.

2.2 'Computer art' discourses

> ... the term 'computer art' had come into disrepute as it tended to isolate works of art produced using computers and artists producing them from general art discourse. (Bell, 1991, p.13).

Although art using computers has been in existence since the 1960s, it has until recently been viewed as a specialised subculture, and has been bypassed to a certain extent by mainstream contemporary art debates. For example, in the 1980s, when much contemporary art was informed by Post-Modernism and debates on representational politics where gender, race and sexuality were explored, much specialist 'computer art' literature was debating Modernist (rather than Post-Modernist) concerns of abstract shape and colour, and whether computers could be truly creative. However, some established periodicals such as *Leonardo* have recently reflected a move to the mainstream, so that for example Kirsch's 1988 article 'The Anatomy of Painting Style: Description with Computer Rules' is more likely in the 1990s to be the ordinary cultural criticism of Neumark's 1995 'Interactive Journeys: Making Room to Move in The Cultural Territories of Interactivity (Aesthetics and Politics Of Computer Imagery In Popular Culture)'. Even relatively recent theses however, such as Paul Margerison's (1994) *An Algorithmic and Interactive Approach to Computer Art*, tend to dwell on the specifically mathematical and logical structures relating to computer-based visuals, such as Fractal images.

As mentioned in the previous section, some conferences/events such as ISEA have also reflected this move in the 1990s, whilst other events such as *Ars Electronica* in Austria have retained much of their 'computer art' specialist concerns: Richard Wright points out that in 1992 the *Prix Ars Electronica* competition

> ... deliberately set out to restrict prize winners ... (effectively defining computer art as algorithmic art), with the result that nearly all that year's prize winners were people who wrote their own software. A peculiar result of this policy was that most winners were from computer science and engineering backgrounds, since they were the main group possessing the right technical abilities. (1995, p.96).

This 'old school of computer art' (which could perhaps be distinguished from the newer wave of artists who happen to use existing software packages such as Director), is often characterised by examples of 'art made by scientists' — which may be technologically sophisticated but artistically naive. The artworks often involve abstract psychedelic colours and sounds which are somehow triggered by body movements, but tend to have little content. There are notable exceptions however, as many early artists had little choice but to write their software, but produced artworks which make strong comments on the technology itself. Norman White's *Helpless Robot* for example (Rokeby, 1995, p.151) is a robot which has to ask the help of audience in order to move at all.

'Computer art' literature can be highly eclectic — sometimes including useful arcane technical details and unusual areas of research such as Dissanayake's 1974 'A Hypothesis Of The Evolution Of Art From Play'. Characteristically, *Ars Electronica* 1990 included presentations by Timothy Leary (psychedelic guru), and Autodesk Inc. (a technology production company), with a generally futuristic theme (for example, a symposium entitled 'Of the Machines of the Spirit and the Spirit of Machines), but not many practising artists.

Books concerning computer art tend to embody much the same values described already, usually coming from a design rather than fine art academic background, and falling into the 'general overview' category (Goodman, 1987; Loveless, 1989; Popper, 1993a; Cotton and Oliver, 1993; Baker, 1993).

Another development of the 1990s is the firming up of different areas of 'computer art' into differentiated fields with their own periodicals, so that there are now periodicals such as *Creative Technology* that deal with 'digital imaging' (i.e. 2D digital images and graphics only as opposed to say robotics or interactive video). *Verbum* in the USA is 'a Journal of Personal Computer Aesthetics', whilst *Inter Art Actuel* (Montreal) deals with interactive computer-based, and theatrical, arts.

2.3 Art criticism

Within fine art discourses, computer-based art has received relatively little serious attention, remaining in the 'specialist' area rather than being treated as 'just another artform' (i.e. when reviewing exhibits, technology specialists are usually called in rather than the usual reviewers, and the odd 'about technology' article

appears.) Magazines including *Artforum*, *Art Monthly*, *Flash Art International*, *Artweek*, *New Art Examiner*, *Art Press*, and *Kunstforum International* evince this kind of occasional interest, which ranges from those still unsure 'if it is art' to the naively utopian:

> The capabilities of the technology to revolutionize the whole experience of viewing a gallery exhibition, and to democratize access to the visual arts ... (Masterson, 1994, in *Art Monthly*, p.33).

Very little review material addresses in more detail the relationship between interactive art and its gallery public, Coleman's (1994) questions concerning the artwork *Sonata* (see 6.2) being one of the very few:

> ... you really need an hour alone with the thing, which is impossible under the circumstances of everyday museum attendance. ... How do you attract an audience with an attention span of three seconds? ... What audience will these strategies drive away? (p.14).

Unsurprisingly, it is those periodicals which either deal with lens-based media (*Creative Camera*, *Afterimage*, *Ten.8*, *Perspektief*, *Screen* etc.) or with 'alternative'/new/cross-media art (*High Performance*, *Parallelogramme*, *Parkett*, *Frieze*) which tend to cover contemporary computer-based art in more informed detail, such as Lunenfeld's proposals (1993, 1996) for critical structures concerning interactive art.

Those periodicals with a stated aim to cover fine art in new technology contexts (*Variant*, *Mediamatic*, *Mute*) have a fairly short and chequered history but tend to combine fashionable graphics with reviews (including younger new artists), news, and cultural criticism such as Sadie Plant's work on 'Cyberfeminism' (*Variant*, 1993), and Suhail Malik's writing on 'the new flesh and Michael Jackson' (*Mute*, 1994).

Books specifically concerning computer-based interactive fine art are relatively few (including Moser's (1995) *Immersed in Technology: Art and Virtual Environments*), although chapters on the subject are included in more general art publications (for example Durland's (1989) chapter on Internet-based art in the book *Art in the Public Interest*). Several exhibition catalogues, however, form useful sources of writings (Wombell, 1991; Druckrey, 1993; Dompierre, 1995; Brown and Graham, 1996), and some special issues of periodicals which cover interactive art

in depth include *Art and Design* (1995), *Art Journal* (Fall 1990, Winter 1995), *Artweek* (Feb. 1995).

The firmest art theory base for interactive artwork perhaps comes from film or video art: as a time-based medium involving 'new technology', moving image and sound, many theories concerning audience and philosophy can also be usefully applied to newer work, for example Wooster's (1991) deconstruction of the utopian 'romance of interactivity' and its claims to be a democratic artform. Krauss' 1978 'Video: The Aesthetics of Narcissism' is a useful theory of the pleasures that the video artist may glean from the reflection of their own video actions. This theory may perhaps be applied to cover the pleasures for the user of an interactive artwork, in seeing their own actions reflected back to them. Theorists such as Cubitt (1992, 1996) have usefully delineated the ways in which interactive artworks differ from the perceptions of film and video, and Klein (1991) has outlined the commercial repercussions of the menus of choices offered by new media, in terms of audience:

> '... Previous media revolutions ... represented a consolidation of audiences ... The direction of the new media is exactly the opposite — instead of consolidation, fragmentation. Smaller and smaller audiences, and more and more sharply defined by their interests and attitudes.' [quoting the president of J. Walter Thompson] (p.401).

Published art material sometimes includes opportunities for the artists themselves to speak about their work, and when they are allowed to do so, often have interesting insights into how their work is used:

> Once having discovered the touch screen, the dilemma faced by the viewer/participant is whether to keep making selections or to move toward the centre of the space in order to fully comprehend the results of his/her interventions. This, in effect, frees up the touch screen for others to participate in the selection process. (d'Agostino, 1991, p.323).

> ... the viewer is forced into a path-following, choice-making state of mind. 'Multi-media' leaves no room for the possibility of loss of self, of desire in relation to the unfolding on-screen drama. (Weinbren, 1993, p.30).

Any more lengthy explorations of the issues, however, tend not to be provided by fine art literature, but rather by the field of cultural criticism.

2.4_ Cultural criticism

The wide field of cultural criticism is one of the largest and best-established bodies of published work concerning interactive computer-based art. Many good compilation books cover this field, enabled mainly by research based in colleges, and the published material has a firm history which predates more recent interest, for example Burnham (1980) 'Art and Technology: The Panacea that Failed' in *The Myths of Information: Technology and Post-Industrial Culture*.

Cultural criticism has examined the contemporary meaning of new technologies in relation to the wider culture of employment, interpersonal communication and the future. It usefully explores the possible audience attitudes towards technology *per se* which may affect any art and technology exhibition. This is hardly a new concept:

> Technology discloses man's mode of dealing with nature, the process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations and of the mental conceptions that flow from them." (Karl Marx 1887 quoted in Woodward, 1994, p.47).

Technology is obviously not a neutral construct, nor is it necessarily democratic: 'The future has arrived, it just isn't evenly distributed.' (William Gibson quoted in Seward, 1992, p.107). The literature covers a wide range of issues, but perhaps could be differentiated into the following areas of Work/Class, Race, Gender, and The Body:

Work/Class

Computers and other new technology have been affecting the world of commerce substantially (Huws, 1985; Garson, 1988; McNeil, 1991; Winston, 1993; Aronowitz, 1994; Spooner, 1994; Wright, 1995; Barry, 1996), and for many people work is their first point of contact with the technology, necessarily affecting how they would view technology in other, gallery contexts. Theorists have been exploring whether new technology may be ' "decomposing" the working class' (Autonomie, 1985, p.29), by changing management, education and international financial structures, which affect individual workers' lives: '... an information society is the purest form of capitalism. When bodies are constituted as information, they can not only be sold but fundamentally reconstituted in response to market pressures.' (Hayles, 1993, p.86).

In terms of the way we live, Matthew Fuller (1994) describes the enthusiasm for Internet-based 'virtual communities' as a 'White Flight into cyberspace' — escapism for white/middle class people from the harsh realities of inner-city street culture which affected the early development of techno-style (Ross, 1991).

Race

> 'One nice thing about on-line communication is that everyone is equal; no one knows how old a participant is, or what color, or what religion — which frees our minds a bit to listen to more diverse opinions'
> '... I encounter a lot more racist ... messages than 'in real life'...
> 'Here's a thought: Do you think bigoted people are attracted to cyberspace, or are 'normal' people encouraged to show their hidden bigoted side?'
> (quotes from Compuserve African American forum, and GEnie conference, in Bailey, 1995, p.43).

Debate about race, culture and new technology tends to contrast utopian 'colour blind' rhetoric with issues of access and real communication. For example, concerning world-wide culture, Search's (1993, p.63) suggestion that 'Multimedia networks can use authorship and invention, the semantic structure of the program, and the semiotics of interface design to articulate and preserve cultural identities' is baldly refuted by Wark's view that because of the true depth of cultural divides, 'New technology cannot be used to preserve cultural differences.' (1995b, p.22). Mattelart (1985, p.27 *ff.*) was pointing out some time ago in 'Infotech and the Third World' how the global information economy had very already had very firm ideas on whose information was valuable, and who had no business to be on the superhighway, even if they had the means of access. Others have criticised more generally the 'global village' rhetoric of networked technology (Cavellaro *et al*, 1992; Ely, 1989).

Delany, Tate, and Rose (in Dery, 1993a, and Delany 1994), and Keith Piper (1993) have pointed out that Black American hip-hop culture was perhaps the harbinger of the 'sampling culture' — the 'cut and paste' of parts of images and sounds which characterises much electronic art. Thus if interactive art is intending to interact with its audience, a very obvious question in terms of race, gender and technology might be 'which audience?'

Gender

> Machines and women have at least one thing in common: they are not men. (Plant, 1993, p.13).

High technology is deeply gendered, its institutions highly male/white dominated (Janssen-Reinen *et al*, 1990; McNeil, 1991; Wajcman, 1991; Diamond, 1994; Kantrowitz, 1994), and its consumers primarily young, white and male (Laurel, 1989c; Jacobs, 1994). There is debate that the most basic screen conventions and information structure used on computers tends to use learning/cognitive patterns more typically male than female (McCarthy, 1993).

Any audience approaching a technology-based artwork is therefore going to be influenced by this, and many writers have suggested theories which may affect their philosophical position in relation to 'the machine' — Who/what are we when we interact with a computer? (Albury, 1985; Rogers, 1992; Sobchack, 1991; Penley, 1991; Ross, 1991; Pryor and Scott, 1993; Gordon, 1991; Tenhaff, 1995).

Whilst acknowledging the militaristic dominance of much technology, theorists such as Haraway (1990) and Plant (1993, 1995) see some positive possibilities for women in 'the cyborg' — the melding of human and machine — as a possible freedom from past male structures; 'Cyborgs are not reverent ...' (1990, p.151) claims Haraway, who sees the fatherless cyborg as escaping from Oedipal histories. Alluquère Rosanne Stone has written very extensively on the subject, both analysing male technological institutions (1995b) and exploring possible positions for gender in an artificial space. She suggests that 'To become the cyborg, to put on the seductive and dangerous cybernetic space like a garment, is to put on the female.' (1991, p.109) but also problematises the boundaries between male and female by exploring 'computer cross-dressing' phenomena.

The Body

> Forgetting about the body is an old Cartesian trick, one that has unpleasant consequences for those bodies whose speech is silenced by the act of our forgetting; that is to say, those upon whose labor the act of forgetting the body is founded — usually women and minorities. (Stone, 1991, p.113).

Connected to debates about gender is a large debate (Heim, 1991; Wahl, 1993; Griggers, 1993; Graham 1995) concerning the position of 'The Body' — does technology such as VR or the Internet 'leave behind' the body?

> Simone de Beauvoir argued that masculine culture 'identifies women with the sphere of the body while reserving for men the privilege of disembodiment, a non-corporeal identity' ... (Penny, 1995c, p.34).

Attitude to the body does tend to be strongly gendered, both because of the subconscious and because of cultural pressures from mass media. Therefore this is likely to affect an audience's relationship to any computer-based interactive artwork where the physical or conceptual position of 'the body' is important.

2.5 Museum studies

Periodicals such as *Curator* and *Museums Journal* discuss both the political and practical repercussions of exhibiting to the public. Recently this has included some discussion of the affects upon audiences of hands-on participative exhibits (Stevenson, 1987,1993; Winterbotham, 1993; Perrot, 1993; Eason and Linn, 1976; Prince, 1985; Lantos, 1994; Birringer, 1992).

Whilst the periodicals tend to be mostly positive or informational about the bright new world of interactivity (stressing the 'educational' value and improved retention of information), some books and catalogues have taken a much more critical look at their wider affect. Cornwell's argument (1993, 1996) that an uncritical craze for computer interactivity in art galleries risks 'institutionalizing art as consumer fun' (1993 p.12), is backed up by a more general critique of the situation of the museum in a market culture:

> ... it also does not stretch the imagination too much to realize that this industrialised museum will have much more in common with other industrialised areas of leisure — Disneyland say — than it will with the older, pre industrial museum. Thus it will be dealing with mass markets, rather than art markets, and with simulacral experience rather than aesthetic immediacy. (Krauss, 1990, p.17).
>
> Take for example the changes at the Natural History Museum. Following a visit by seventeen senior managers to Disneyworld in Florida in 1989, major changes have been instigated within the museum to restore attendance figures following a 40 percent drop in visitors after admission charges were imposed in 1987. (Worpole, 1991, p.144).

Richard Statham, in *Museums Journal* 1993 also expresses concern over the position of 'the actual object' as opposed to simulacra:

> There is clearly a danger that as VR becomes more realistic and powerful it could trivialise and upstage 'real' exhibits. (p.35).

However, despite fairly extensive discussion of applications of technology to interpretative and educational exhibits, with the exception of Cornwell there is

very little discussion of interactive computer-based art exhibits. In fact, because the first inroads by interactive computer technology into museums and galleries was often the multimedia information or archive terminal, there is often some confusion in audiences as to whether an artefact is art, or educational/ interpretative (for example, the common assumption that *Audio Zone* in *V-Topia* (see 6.2) was not an artwork but 'an exhibition guide').

2.6 Computer science/programming

The 'computer science' field of study, rather like the 'computer art' field, has been showing signs of change in response to 'the multimedia boom' in recent years, moving from a highly specialist technical field to one which shares more knowledge with the wider world — for example, computer science students may now be using the same software packages (such as Macromedia Director) as their counterparts in the graphic design department.

Computer science covers highly technical fields of computer hardware and specialised programming, but the area most relevant to this dissertation is the study of 'interface design', which also overlaps with the general study of 'human factors'. In the past this has concentrated on the limited range of choices for clearest display (such as colours of text and background on a screen) but now involves much more complex graphic screens and sound. Experiments based on the scientific model have tested users' response times and error frequency when using certain software. However, beyond a few very general guidelines on interface design (Galitz, 1993; Preece, 1994; Tufte, 1983,1990) and 'how to make multimedia' (von Wodke, 1993; Blattner and Dannenby, 1992; Berk and Devlin, 1991; Paulissen and Frater, 1992) the literature does not seem to agree on any general rules: As Erickson (1991a, p.3) says; 'Interface problems are often obvious. Solutions are less obvious.' Some literature such as Tucker's (1989) *Interactive Media: The Human Issues*, and Brenda Laurel's *The Art of Human Computer Interface Design* (1991a) explore these problems more widely, with an eye for possible future developments, the latter including chapters such as Kurtenbach and Hulteen's 'Gestures in Human-Computer Communication'. Laurel, although working for large software companies such as Apple, comes from a theatre background, and therefore includes chapters more likely to be usefully applied to interactive art, such as Oren *et al*'s 'Guides: Characterising the Interface'.

Another example of growing crossover between computer and other disciplines is the variable siting of post-graduate students — Catenazzi's (1993) Ph.D. thesis *A study into Electronic Book Design and Production: Hyper-book and the Hyper-book Builder*, for example, was researched in the Department of Information Science of the University of Strathclyde, 1993. As computers become used in many more areas of study and life, the literature of 'computers' seems to become much less specialist, spreading even into popular culture.

2.7 'Popular new technology'

In this field are included popular home computing magazines (such as *Macworld, What PC, Amiga Computing, CD-ROM World*), some mainstream press coverage of art and technology, and some hard-to-classify materials catering for the recent general interest in 'new technology' such as *Wired, Whole Earth Review, .net, Mondo 2000, and Future Sex.*

What these areas tend to have in common is an unsurprisingly positive, if not utopian view of technology, and a view that if it is not perfect yet, it will be in the very near future; 'The coming convergence of memory and processors' (Wired, 1996, p.105). What they also share, even those like *Mondo 2000* with female editors, is a male oriented content ranging from blokeish 'Will you make your mother-in-law sound like a pig or a cow?' (advert phone software Macworld, 1996, p.12), to boyish 'Alien Breed Killing Grounds' (Amiga Computing, 1996, p.81). An American influence is detectable even in those magazines which are not co-productions, and whilst the home computing magazines are primarily reviews of consumables ('Modem Speeds Edge Higher' Macworld, 1996, p.40) they occasionally review an 'art' CD such as Pedro Meyer's *I Photograph to Remember* if produced by a mainstream company.

Mainstream press do occasionally cover art and technology events in a general interest way as opposed to art reviews, and again tend to stress utopian possibilities 'Who wants to walk around a gallery if it's full of toffee-nosed elitists?' (Cavendish, in *The Independent*, 1995, p.23 reviewing an Internet Art Festival).

In the general interest group of magazines, there is often an absorption of Californian 'New Age' language and values (ecological concerns, enterprise culture, high health consciousness, personal development, and a vague collection

of mysticisms). Sobchack (1991) has defined these combined New Age/New Tech values as evinced in *Mondo 2000* as:

> ... a celebratory (and generally economically privileged) subculture vacationing in virtual spaces — modelling themselves (and their politics) after some combination of entrepreneurial, techno-maverick Steve Jobs, and countercultural guerrillas who muck up 'the system' ... (p.25).

Some magazines like *Wired* give reasonably serious coverage of art and technology, especially if it is higher technology such as VR. *Osmose* for example is covered extensively (Davis, 1996), and smaller art events are regularly featured.

In popular culture it is definitely the more enticing aspects of new technology such as VR which get most attention, there is a range of popular books (Wooley, 1992; Rheingold, 1991) and television (Horizon, 1991; Cyberspace, 1996) on the subject, and a whole range of magazines were at one point highly exercised over the possibilities for 'virtual sex' (Bowen-Jones, 'Hi-Tech Sex', *Marie Claire*, 1993). Thus art galleries showing interactive computer-based artworks may attract an audience who may be aware of some 'hyped' aspects of technology, or have a general lifestyle or fashion interest in the culture.

2.8 Brief summary

With such a wide range of discourses informing the background to interactive computer-based art, the prospective audiences for the art may be arriving at a gallery with a very wide range of expectations, informed by games, education or fine art.

The fragmented sets of literature existing presently do little to clarify 'good practice' in dealing with these disparate expectations, as the field is so much in development. However, they help to raise relevant questions, if to not supply fixed answers.

Chapter 3 What is interactive computer-based visual art?

3.1 Some definitions

Almost all of the terms in 'interactive computer-based visual art' have been sites of disagreement at some stage of their history, and it may help to define them one by one for the purposes of this research:

Interactive

> Interactive ... reciprocally active; acting upon or influencing each other. (Oxford English Dictionary, 1992).
>
> Mutual and simultaneous activity on the part of both participants ... (Lippman, quoted in Brand, 1987, p.46).

The word 'interactive' in particular has been used very loosely in recent years, reflecting uncertainty about types of new multimedia and communications technology such as 'interactive television'. Sometimes multimedia is confused with interactive, for example a multimedia promotional package constantly running on a computer/video screen on a trade stand can mistakenly be described as 'interactive multimedia' when in fact it is not interactive. The phrase 'an interactive' has come popularly to mean any kind of 'hands-on' exhibit, usually involving technology, usually educational in intent, in places such as public visitor centres, trade shows, museums etc.

The word often stimulates debates concerning interactivity in art, for example, whether a painting can be interactive with a viewer. Whilst one would hope that some mental activity is stimulated in the viewer, the Oxford English Dictionary definition would not be satisfied unless the viewer could affect or influence the painting. Whilst viewers may fervently wish that the painting was different, they can not change it without some physical intervention on their part. Considering the range of computer input devices, this intervention could be sound, heat etc. as well as the more obvious movement, touch etc.

This poses an interesting definition for interactive artwork, for whilst the physical action of the viewer upon the artwork may be observed, the mental affect of the artwork upon the viewer may not be observed, and may have to be assumed.

The range of levels and kinds of interactivity is explored much more thoroughly in Chapter 4, but for the purposes of this research, the Oxford English Dictionary definition is a functional one, perhaps with the addendum that in the case of artworks, that the artwork should be physically/visibly acted upon by the audience.

Computer-based

> Computer: A programmable electronic device designed for performing prescribed operations on data at high speed, esp. one housed with or linked to other devices for inputting, storing and displaying the data.
> (Webster's Dictionary, 1993).

It is the programmability of computers which enables them to facilitate interactions with users which can develop over time, and be informed by previous interactions. The range and accessibility of computers has greatly increased since early 'computer-art'. They can now be programmed by artists through the interface of easy-to-use software rather than pure code. The means of 'displaying the data' now includes images and sounds and is now closely related to other media such as television. The range of 'other devices' to which they can be linked includes infra-red transmitters and cushions. The computer usually controls the interaction, but the computer itself need not be visible.

The definition of 'computer-based art' as art involving a computer in its means of display, is now more complicated — would an artists' video broadcast via digital television means be 'computer-based'? Thus the definition for the purposes of this research are linked to the word 'interactive': therefore an *interactive* television artwork broadcast via digital television would be 'computer-based interactive art'.

Visual art

The definition of art could (rather tediously) occupy a whole dissertation, but for the purposes of this research, art is deemed to mean artefacts produced by artists for artistic purposes. The differentiation between art and design is a particularly fuzzy one, and one which the arrival of new technologies has helped to blur even further. Peter Gabriel's *Xplora* and more recent projects are commercial CD-ROM products

for example, for which claims are also made as 'art'. The use of Virtual Reality technology, has also been overwhelmingly used for commercial/military uses, which affects readings of the artwork, even when the technologies are used by artists, or artists with technician teams, which further confuses the boundaries. Research on interactive computer-based artefacts from a design point of view has tended to concentrate on CD-ROMs, and has some relevance to this research, but is not the focus of it.

Many interactive artworks include sound, and some are purely sound or text based, but the primary area of interest is works with a significant visual aesthetic component.

The area of research

The area of study is interactive computer-based visual artworks, and can be roughly represented by the following Venn diagram (Figure 2).

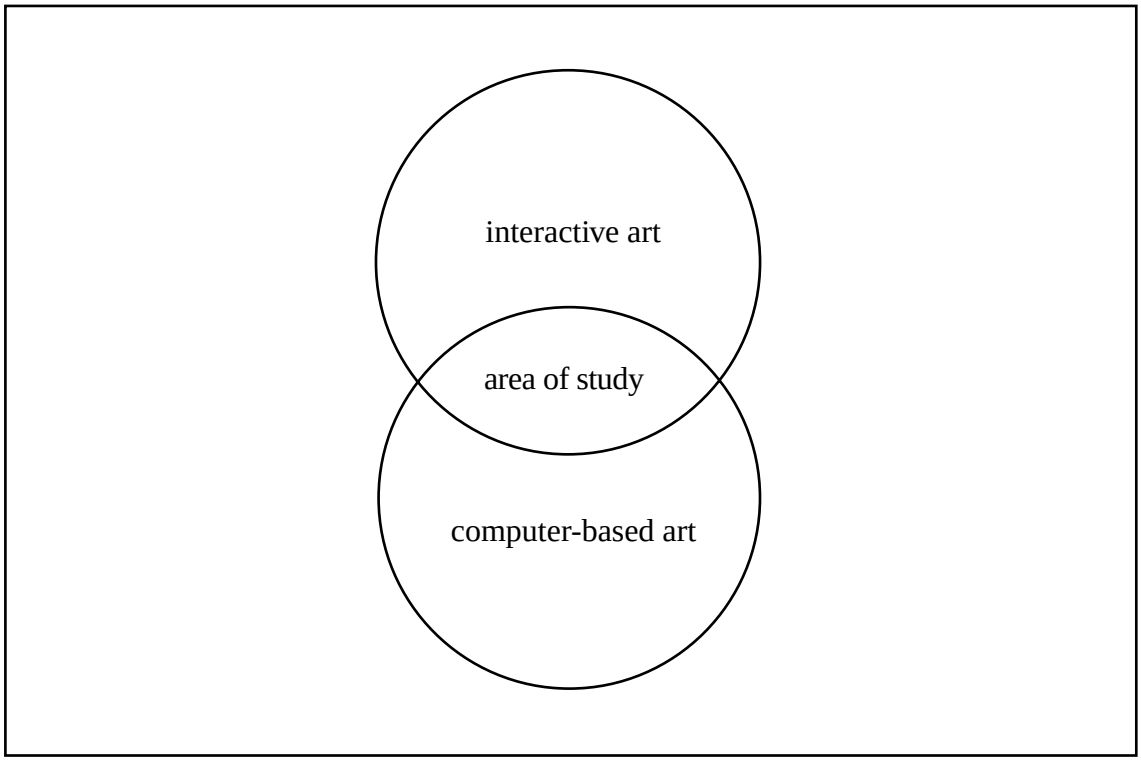


Figure 2: Venn diagram of area of study

The relationships between these main areas is explored in more detail later in this chapter. The research does not of course cover every interactive computer-based

artwork, but a selection of examples taken from wide-ranging research, including research for the *Serious Games* exhibition in Britain, North America and (to a lesser extent) mainland Europe.

An important caveat is that the research was in particular concerned with gallery-based artworks. That is, artworks which are primarily designed to be shown in conventional art gallery or museum spaces. This was the starting point of the chapter on interactive art (Appendix II) from which the research arose, namely the particular problems for these artworks in these conventional spaces. From a curator's point of view this rather tends to exclude some forms of interactive computer-based artwork such as Internet-based artworks. Internet-based artworks are exploring very interesting relationships between the audience and the artwork in relation to participation, but tend to be problematic for the gallery context with regards to their physical presence. The 'monitor and keyboard on a desk problem' can also affect 'single screen' interactive computer-based artworks such as multimedia CD-ROMs. Curators tend to veer towards those artworks which have a larger physical presence/installation, and the concentration of this research has also concentrated on these works.

Cornock (1977) outlined the four variables of interaction: Artwork, audience, time and environment. The artwork-audience relationships are the primary areas of interest for this research.

3.2 Relationship to non-interactive computer-based art

Alongside the recent growth in interactive computer-based artefacts, there has also been a growth in non-interactive computer-based art media, such as digital photography, and light sculptures with movements controlled by a computer (but not by the audience). Some media such as video are moving from analogue to digital with little perceptible impact, as computer-control becomes ubiquitous. Some artforms such as digital photography tend to be shown alongside interactive work at 'technology art' festivals such as ISEA, and may share the debates concerning technology (as explored in Lister (1995)), but do not necessarily share the issues of interaction, and are not the subject of this research.

3.3 Relationship to non-computer interactive/participative art

> In fact, postmodernism can be said to be in cahoots with technological determinism. (Winston, 1993, p.45).
>
> Computer technology originated conceptually and technically in the period of transition within modernism, postmodernism and the contemporary. (Jones, 1993, p.23).

Bell (1991) widens the definition of 'interactive' to include 'participative', which usefully underlines the connection of interaction with political meaning of 'interaction' in past art movements such as 'community art' or 'kinetic art'. Bell quotes Popper's 1975 diagram which traces a 'family tree' for interactive/ participative artwork, (Popper takes a very wide view of 'interactive') and puts in sharp context the wilder claims of 1990s computer-based art as a 'democratic' artform. In considering how Popper's family tree might look with a newer generation added some 20 years later, a parallel branch of the dominant 1980s/90s cultural movement, Post-Modernism, was added (see Figure 3).

Many aspects of Post-Modernist theory fit very smoothly into the flow towards 'democratic art' (although, in the late twentieth century, it seems difficult to imagine any art movement proudly striving towards '*un*democratic art'). Post-Modern tactics are different to those used by previous movements, but can be seen as parallel: In this way Post-Modern politics are less the politics of Socialist Realism, or the class-based politics of 1970s 'community art', and more 'the politics of representation' where the 'Others' — those who are under- or mis-represented by mainstream media, such as gay or Black people, could be seen as 'fighting back' with their own artistic representations. The 'anti-art' Conceptual tradition perhaps has its parallel in the important Post-Modern concept of 'the death of the author', where different readings of the same work are equally valid, and icons from any source from classical to popular can be re-used by artists in their work. This has sometimes been seen as a more 'democratic' or equal relationship between the artist and the audience. The Kinetic concepts of 'Civic Art' and 'Public Art', perhaps have their parallels in Post-Modern artists' use of any media necessary for communicating their ideas, media including the contemporary 'civic space' of electronic display boards or shopping malls, or the 'public space' of television or billboards or bus tickets. The concept of 'audience' has perhaps been redefined more as a set of different audiences which the artist may choose to address, and much of the Post-Modern claim for 'democracy' has been in reaching sets of audiences which because of race or other factors are not usually audiences for art.

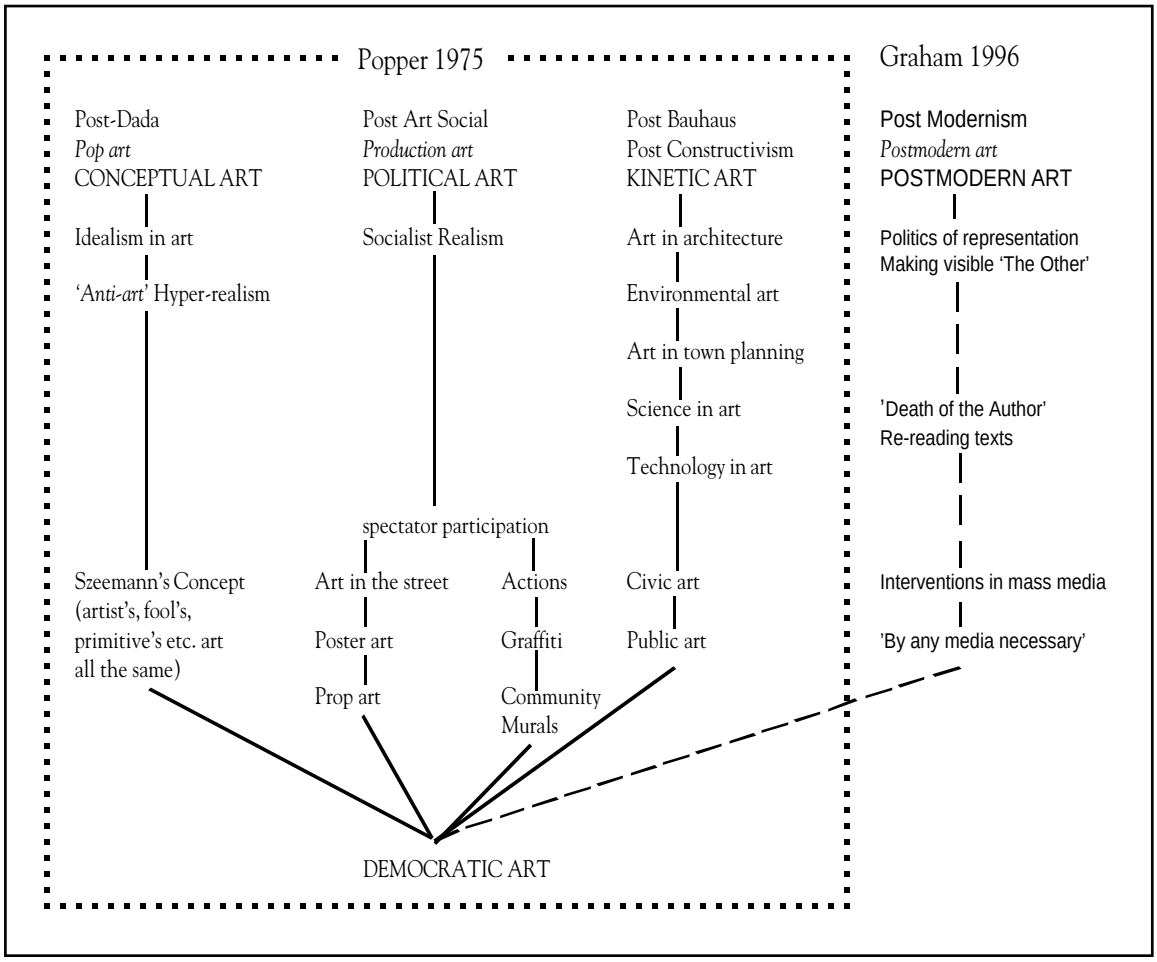


Figure 3: Popper's 1975 mapping of art movements' claims to 'democratic' art, with suggested 1996 parallels.

Post-Modern artists do sometimes engage, like 1970s British community art, in artwork which is interactive with other people during the development of the artwork (as opposed to being interactive with an end product in a gallery), for example an artist who works with workers in a chocolate factory, to design a chocolate bar which is also 'a work of art' (Heartney, 1993), but there tends to be more emphasis (in the USA at least) on the 'brand-name' of the artist being on the work, as opposed to real ownership by the 'community'. Thus Post-Modern traditions of art could be said to lead in some cases towards a form of 'democratic art', although interactional tactics are seen as just one option within a range of available tactics and media.

The position of computer-based art within Post-Modernism (Popper, 1993a/b; Hollinger, 1991; Winston, 1993) is in some ways also a smoothly fitting one: 'The death of the author' is perhaps epitomised by the digital 'sampling culture' of

borrowing parts of images/sounds from other authors, and in the power of the reader to not only re-read, but to change the order and form of, say, interactive multimedia artworks on CD-ROM. The particular claims for art on the Internet as a 'democratic' artform, are based on several aspects of the medium: Its escape from traditional art spaces/audience; the factor of ease/cheapness of 'publishing' on the Internet; the factor of users being both audience and creators for the material on the Internet; the possible anonymity in terms of gender and race; the factor of international interconnections. Criticisms concerning the demographics of participation (Barry, 1996; Spitz 1995) put these claims into context. To talk about 'computer-based art' in the context of Post-Modernism, however, is somewhat contradictory, for Post-Modernism tends to concentrate on the intent and context of the work rather than categorising the work by material or media. Computer-based art is therefore beginning to be criticised (Burnett, 1993) in Post-Modern contexts, in terms of its content rather than its form.

The skills of interactive/participatory art in general, including the process-based interactions of collaborative production in 'community art' are part of the history and skill-base of interactive artwork. Although the research concentrates on contemporary artworks, it is informed by this history.

Chapter 4 Taxonomies of 'kinds of interactivity' within art

4.1 Some taxonomies to date: Bell, Ascott, and Cornock

> Intellectually, one can infer no greater condemnation of a medium than this — the medium places its audience in a position of total sensory absorption and yet total subjective irrelevance. (Randolph, 1995, p.176).

As outlined in Chapter 3, the word 'interactive' is often used very loosely, or even inaccurately, when applied to art. This may stimulate many arguments but is not very useful for stimulating informed debate. The question of whether one piece is 'more interactive' than another is one difficult to address without more accurate terms of reference; do we mean 'more democratic', 'more immersive', 'more creative', 'more mentally stimulating' or 'more physical'? Is an immersive VR environment with full data suit 'more interactive' than a simple point and click screen where the user gets a chance to input their own ideas? Might an artwork have varying levels of interaction throughout the duration of a viewing?

Whilst any attempt to hierarchically classify works of art tend to have a faintly ridiculous whiff of Dr. Casaubon about them (being an unending, obscure task dedicated to pinning down the intangible, which tortured the said character in George Eliot's *Middlemarch*), some kind of classification might be useful. Given that there is not one smooth scale of '*levels* of interactivity', it may be more productive to look at '*kinds* of interactivity'.

Some theorists to date have made extended attempts at taxonomies of interactive art, most notably Steve Bell, a computer graphics artist. Steve Bell in his 1991 thesis summarised certain predecessors' taxonomies and added some new proposals of his own. His analysis drew mainly from theorists and artists from a computer art (rather than fine art) background, including Myron W. Krueger (1983), and Roger Malina (1988) but more especially concentrating on Stroud Cornock and Ernest Edmonds (1973, 1977) and Roy Ascott (1967). I have attempted to summarise these latter classifications in diagrammatic form (see Figure 4), along a very nominal sliding scale of 'more or less interactive'.

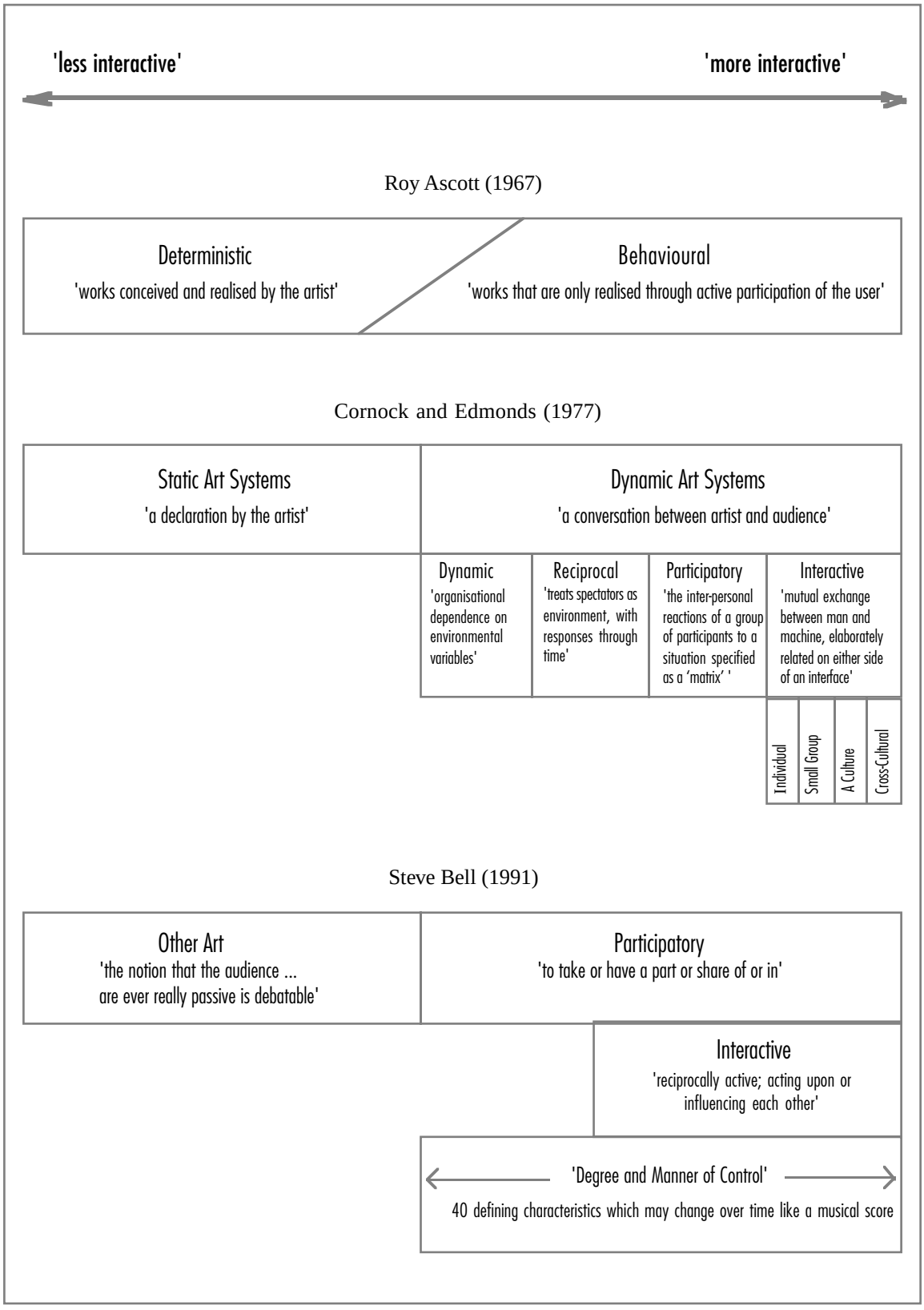


Figure 4: A diagrammatic interpretation of some previous taxonomies.

Roy Ascott's classification of 1967 was to some extent stimulated by the 1960's disruption of the linear 'communication model' of art and audience, with the growth both of avant-garde 'happenings' or performance art, and politically motivated 'community arts'. In both of these areas of art the role of the audience was participative. Ascott suggested a bifurcation of art (whether computer-based or not) into:

1. Deterministic: Works conceived and realised by the artist.
2. Behavioural: Works that are only realised through active participation of the user.

(Cornock, 1977, p.5, paraphrasing Ascott, 1967).

Cornock and Edmonds' own taxonomy (1973, 1977), developed over some years and simplified in 1977, went on from a similar bifurcation to divide the 'Dynamic' category of art into more detailed subdivisions:

> **Dynamic Art Systems**: ... defined in the organisational dependence of the artefact on some environmental variable(s).
> **Reciprocal Art Systems**: ...treats its spectators as its environment, but the successive states through which it passes are related to participatory responses only in their timing.
> **Participatory Art Systems**: ... the inter-personal reactions of a group of participants to a situation specified as a 'matrix'
> **Interactive Art Systems**: ... exists in a mutual exchange between man and machine, but the successive states through which it passes are elaborately related on either side of the interface. ... An 'interactive' art system has within it an artefact so organised as to be able to sustain a conversation with the user approaching the kind of conversation we witness between people. ... The interactive art system, viewed as a psychological event, may be set into the context of a hierarchy of levels of interaction:
> Level one: The individual
> Level two: The small group
> Level Three: A culture
> Level four: Cross-cultural interactions
> (Cornock, 1977, p.8-21).

These subdivisions usefully start to differentiate between interactions in a way which is not dependent just on the means of physical interaction.

Steve Bell drew together other more minor attempts at classification, and added his own. He usefully problematises the bifurcated categories of interaction by noting that 'The notion that the audience for any work of art are ever really passive is debatable.' (1991, p.15).

He also itemised the range of 'I/O' (input/output) methods that can be used between people and computers for communication: The human fundamentals of sound, vision, touch, smell and taste being interfaced with computers via devices from keyboards and touchscreens to temperature sensors and chemical analysers. He mentions 144 different ways in which I/O methods alone can be categorised, I/O being only one way in which 'kinds of interaction' can be classified. Another of the characteristics he mentions which can be used to classify interactive artworks is the mental positioning of the audience — are they 'outside looking in' or controlling from within, and so on. Again he usefully points out that this is not necessarily connected with their physical position. (p.53)

As an artist his interest was in the usability of taxonomies, and he proposed a more flexible sliding scale based on:

> ... a system of analysis in which the principal characteristics are considered to be those which contribute to the degree and manner of control afforded to participants. (Bell, 1991, p.i).

He identified 40 characteristics, including both physical means of interaction and the philosophical positioning of the viewer. These characteristics included:

> The degree to which the program in a work can be changed during participation.
> The degree to which interaction is at an imaginary or actual interface.
> The degree to which interaction between human and human is directed via an interface or via a computer.
> The way in which the participant is placed in relation to a programmed world: outside looking in etc.
> Whether participants can interact with each other in a programmed world.
> The conventionality of the programmed interface and its use.
> The combination of physical I/O routes used.
> (Bell, 1991, p.207).

Bell also proposed a music-like 'score' which could map kinds of interaction throughout the duration of an artwork. His proposals altogether form a less rigid taxonomy particularly useful for artists, who are aware that 'degrees of physical participation' (from button pushing to whole body) are *not* the same as 'degrees of mental or emotional participation' but that they nevertheless affect the audience's perception in complex ways. In Bell's analysis, each artwork has its own unique 'score', recognising the chaotic variables in each system.

Despite the growing public awareness of interactive computer-based artefacts since Bell's writing in 1991, there appear to have been no major attempts at a taxonomy of computer-based interactive artwork since then. John Stevenson (1993), in his research on the long-term impact of interactive science exhibits, simply classified exhibits as static, reactive or interactive. Brenda Laurel (1989b) proposed a 'taxonomy of interactive movies' but this is wholly concerned with 'single screen' works, and concerns levels of narrative rather than a wider range of interactive experiences. Her work concerning theatrical metaphors for computer interaction has also led her to classify constituents of those works in terms of theatrical 'Action, Character, Thought, Language, Melody (pattern), Spectacle (enactment)' (1991b, p.50), but they are rather terms for deconstruction than taxonomy.

David Rokeby, an artist working with interactive technology who has written thoughtfully on the subject, has divided artworks into categories which he finds 'particularly useful':

> There are a number of distinct models that can be used to represent the interaction between an artwork and an interactor. ... . The artwork can be conceived of as a navigable structure or world, a creative medium in its own right, a transforming mirror, or an automaton. While each interactive work can be profitably examined in the light of several of these models, each model offers a unique perspective on the issues involved in interaction. (Rokeby, 1995, p.138).

These categories are fairly self explanatory and provide a useful means of mapping the broad aim of the artist. However, there may be a certain amount of crossover between categories — for example an automaton could also perhaps be a creative medium if the user can control it in order to do creative production of some sort.

4.2 Some re-interpretation: using a metaphor of 'conversation'

> Art is essentially a conversation with the viewer, who is always reinterpreting and constructing the work of art. (Shaw, 1995, p.73).

> The automaton is the analogy of man and remains his interlocutor (they play chess together!). The machine is man's equivalent and annexes him to itself in the unity of its operational process. (Baudrillard, 1991, p.178).

Having found existing taxonomies to be useful in different, partial ways, it was perhaps most relevant to 're-interpret' and comment on them rather than to invent a whole new taxonomy which may well remain just as unused as previous attempts!

As 'conversation' is used by several theorists as a metaphor for discussing interactive art, it seemed to be a good general starting point. A personal starting point was a point of departure from previous taxonomists: Cornock defined his interactive category as 'approaching the kind of conversation we witness between people' (p.21) and although he admitted that '... at the time of writing the *interactive art system* remains speculative' (p.12) the inference is clear that computers will someday be capable of this. Whilst previous taxonomists strive for and perhaps assume that 'symmetrical interaction' (Bell, 1991, p.22) exists in interaction with computers, myself and others are more sceptical:

> It should be quite clear that no meaningful communication — in the sense of a true exchange of ideas, thoughts, opinions, or discussion (where one interlocutor might suddenly lead the conversation into an unexpected direction due to his partner's response) — can ever emerge from programmed technology. What we get instead is a simple alternation, based on the rules set by the programmer. ... communication also has a lot to do with the unsaid. (Sarkis, 1993, p.13).

A key reason for choosing conversation as a metaphor is because most people have a developed critical sense of 'symmetrical interaction' within conversation, and are quickly aware if their partner is 'a bore' (monologist of inflexible subject) or 'self-obsessed' (brings every subject around to themselves) or some other *a*symmetry of interaction. Humans are (unlike machines) also very good at knowing if we are conversing with a machine or a person: The Turing Test, the abiding test of true artificial intelligence, is based around being able to differentiate between a human and a programmed interlocutor (Woolley, 1992, p.105). Despite many very complex computer programmes, the existence of true 'artificial intelligence' to this level (or even to satisfy the Turing Test) has yet to be proved.

This interest in 'real conversation' as an acid test of interactivity led the research on to the construction of a 'common language' parallel analysis of Cornock and Edmonds' taxonomy (Figure 5), using conversation as a metaphor.

Whilst using a metaphor of words for visual art is perhaps a little strained, on the other hand words are a primary means of social interaction, as well as being a primary means of computer interaction (visuals being a fairly recent addition).

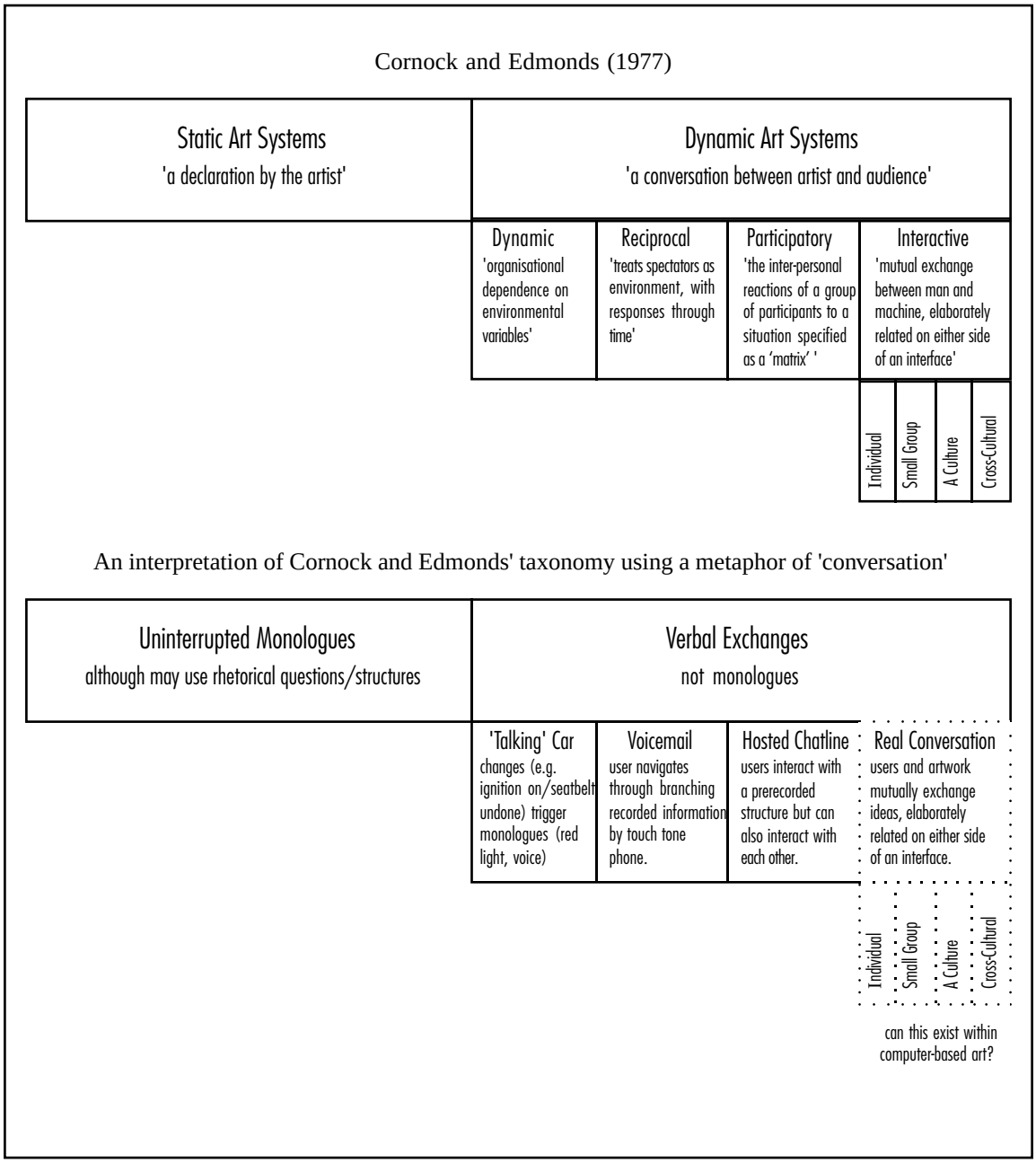


Figure 5: The author's parallel analysis of Cornock and Edmonds' taxonomy using a metaphor of 'conversation'.

Thus a parallel to Cornock becomes:

Uninterrupted Monologues; verbal outpourings which respond in no way to any other intervention. Monologues can of course use structures such as rhetorical questions to elicit mental responses from their assumed audience (in the same way that viewers of 'non-interactive' art are not necessarily mentally passive).

Verbal Exchanges: not monologues — this could cover exchanges of words from a real conversation to two people shouting at each other but not listening. Within this there are the subdivisions using metaphors of interactive devices:

The 'Talking' Car; such as the simple computer in some cars which, if the ignition is turned on and the seatbelt is not fastened, will tell you to fasten your seat belt. If a dog turned on the ignition, it would do the same.
The conversational equivalent would be an interaction with an employee who is authorised to say "have a nice day" to people as they leave a building or say hello, but is not authorised to say anything else.
The artwork equivalent would perhaps be a kinetic sculpture where lights whirled around if a viewer approached.

Voicemail: automatic telephone answering systems that take the user through a series of branching conscious choices ("for information on the UK, press 1 ... for information on Scotland, press 1 ... for information on Ayrshire ... press 1" etc.)
The conversational equivalent would be someone with knowledge of the first six pages of a phrase book — able to respond to certain simple questions with simple prepared answers.
The artwork equivalent would perhaps be an interactive CD where pathways are chosen by clicking, or a VR environment were the viewer chooses spaces to move through.

Hosted Chatline: some telephone services provide a pre-recorded 'host' to introduce people from relevant parts of the country, or by simple gender choices, but also provide opportunities for people to talk to other.
The conversational equivalent would be a conscientious party host who supplies social lubricants, selects like-minded people to introduce with a phrase designed to stimulate their conversation, but doesn't have the time to get involved further.
The artwork equivalent might be an Internet-based work structured so that each visitor can leave a message/image in response to the artwork, and can read and respond to or manipulate other visitor's comments/contributions. Such a work, if sophisticated enough, may also be able to respond to input from the audience, for example, if they choose a certain area of special interests then they could be directed towards messages on this subject, etc.

> *Real Conversation*: an evolving, unpredictable exchange of ideas — can this exist when computer-based?

After starting to use the conversational metaphor as a taxonomy, a useful set of corollaries was discovered (although not necessarily concerning art) to Andy Lippman's definition of computer-based interactivity as: 'Mutual and simultaneous activity on the part of both participants ...' (Lippman, quoted in Brand, 1987, p.46). These corollaries are usefully summarised by Stone (1995a):

> One is *mutual interruptibility*, which means that each participant must be able to interrupt the other, mutually and simultaneously. Interaction, therefore, implies conversation, a complex back-and-forth exchange, the goal of which may change as the conversation unfolds.
> The second is *graceful degradation*, which means that unanswerable questions must be handled in a way that doesn't halt the conversation ...
> The third is *limited look-ahead*, which means that because both parties can be interrupted there is a limit to how much the shape of the conversation can be anticipated by either party.
> The forth is *no-default*, which means that the conversation must not have a preplanned path; it must develop fully in the interaction.
> The fifth, which applies more to immersive environments (in which the human participant is surrounded by the simulation of a world), is that the participants should have *the impression of an infinite database*.
> Thus interactivity implies two conscious agencies in conversation, playfully and spontaneously developing mutual discourse, taking clues and suggestions from each other as they proceed. (p.10-11).

These demands for 'true interaction' to be like a 'real conversation' are so complex and so demanding that sometimes even some non-computers (humans) might be hard pressed to maintain them.

It seems doubtful whether Cornock's 'Interactive' category (if indeed 'approaching the kind of conversation we witness between people') will ever be attainable by computer programmed artefacts alone. Perhaps 'approaching' is the operative word, or perhaps the conversation facilitated by computer programs could be likened to a conversation where one person (the computer) is not a good listener, or where a culture proscribes very narrow and formulaic responses.

Certain artworks have attempted to use the structure of 'a conversation' very literally: Luc Courchesne's 1990 *Portrait One* for example (see Appendix I, and Figure 6) uses a head and shoulders video shot of a character on a touch screen as its

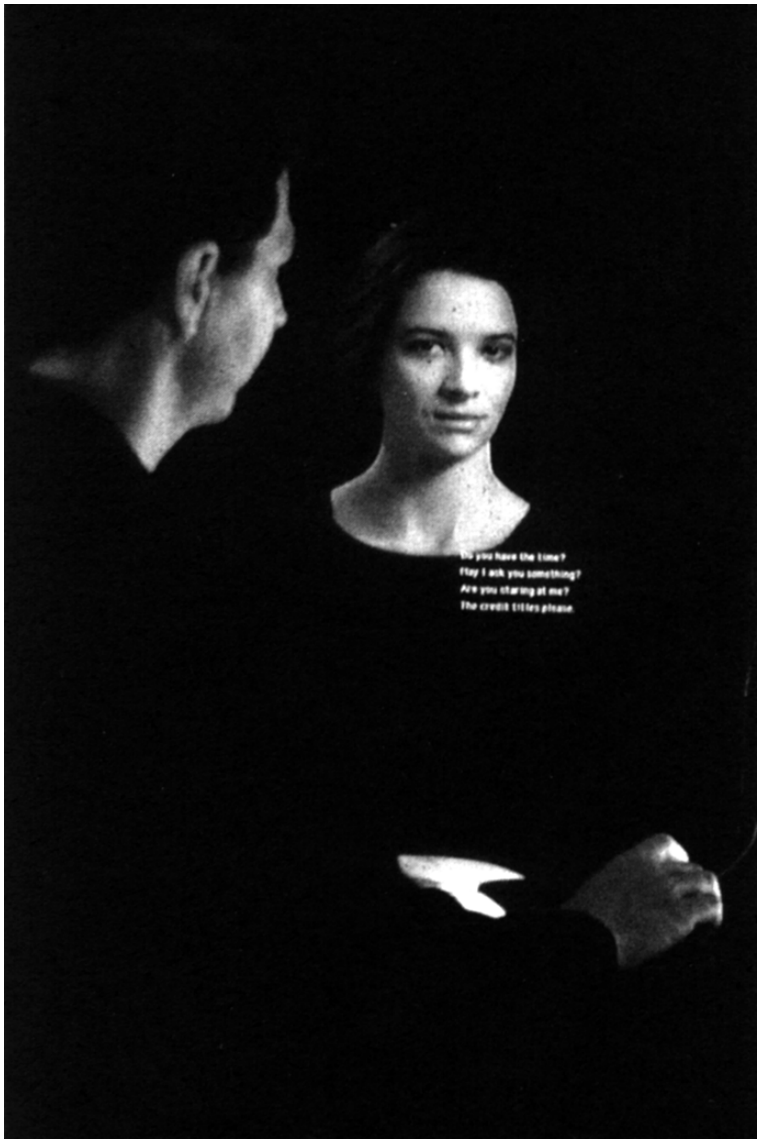


Figure 6: *Portrait One* (Luc Courchesne, 1993) with user.

interface. The viewer can touch/click one of four phrases/questions at the bottom of the screen, and the character responds appropriately with a short (about five seconds) video clip of monologue. There are several characters and the scripts have some diversity. The actors are good and the choice of 'your comments' include some hostile and quirky options as well as the everyday. There is cause and effect in that if you are consistently hostile the character says good-bye and disappears, and if you are quirky, so are they. However, for me the piece soon palled and I became frustrated at the choice of comments one could make, most especially because they usually positioned the viewer as a heterosexual male (the female characters flirted, whilst the male characters were unfortunately provided with no chat-up lines from the viewer). The computer had all the best lines; the viewer had no real voice —

an asymmetrical interaction where words were put into the viewer's mouth. When computer programmes attempt 'conversation', it often serves to underline how complex and elusive *real* conversation is.

Courchesne, as a French-speaking Canadian, often creates his work in French and English versions, which leads on to the issue of Cornock's further subcategories of 'Interactive'. Cornock acknowledges that cross-cultural interaction demands a higher level of skills than dealing with one individual, which highlights another useful metaphor of conversation: Imagining that a symmetrical conversation *was* possible between computer programme and humans, and that humans had the chance to speak — would they? For example, metaphorically thrusting a microphone under people's noses and demanding 'speak' might elicit many different responses, from confident spiel to completely dumb struck, in which latter case interaction would still not be symmetrical. Such a mythical programme would need considerable social skills in order to assure that actual interaction managed to take place. Social skills, as well as cultural references and world views, are not necessarily transferable from culture to culture. Again those highly complex tasks that even humans manage with difficulty seem well beyond what can ever be managed by a computer programme.

In using Cornock's categories to create a common-language taxonomy which was memorable 'in the field' and yet was sharply critical, a useful research tool was found which was able to inform the choice of artworks as case studies, and the analysis of many other 'interactive' artworks encountered.

Chapter 5 Audience interaction with interactive computer-based visual art in galleries

5.1 Background debates

As briefly outlined in 2.5, there is an existing background of debates relating to the impact of interactive exhibits in museums in general, although relatively little examination of interactive computer-based fine art.

When considering making an evaluation of interactions in galleries, a primary given variable is the cultural meaning of the gallery itself — an art institution with an elitist history, a 'no-touch' tradition, and despite many efforts to the contrary, a resolutely middle-class demographic of visitors (Heady, 1984; Hood, 1983; Hooper-Greenhill, 1985; Nash, 1975). Any visitor to an art gallery is likely to be subject to not only the possibly intimidatory affects of this history, but to so many other variables affecting their behaviour, that a pragmatic, hybrid approach is suggested in order to obtain useful pointers from case studies as opposed to attempting comprehensive answers of dubious reliability.

To an extent the act of attempting any kind of evaluation in a gallery is a political action in itself. Evaluations and reports are often used for political purposes within institutions, and the interpretations of reports are sometimes used as simplistic arguments for 'giving the average public what they like', as opposed to pointers for encouraging knowledge of audience variability. This context should perhaps be borne in mind whenever considering evaluation.

5.2 Some methodologies for evaluating interaction, and some existing knowledge

Developing a suitable methodology for case studies of interactive artworks presented a complex challenge, with few existing models of experience. However, adjacent fields of methodology do exist, with existing results and findings on which to build:

5.2.1 Computer software evaluation

The evaluation of mainstream computer software such as spreadsheets, word processing, or multimedia packages etc. is primarily concerned with clarity and speed. Commercial forms of multimedia evaluation such as the MUSiC evaluation developed by Brameur (Kelly, 1994) concentrate mostly on the evaluation of large-usership multimedia such as databases used by secretarial staff.

Methodologies primarily centre on software which logs the mouse and keyboard actions of the user, which can track task times and 'correct' completions but of course is only a partial picture of use. Other methods include video observation of users, and Gomoll (1991) suggests alternative techniques such as getting the user to talk aloud as they use programmes as a means of feedback. Software evaluation often takes place under controlled, individual use conditions, and evaluation designers can select a stable user type, even down to the level of education.

This field has suggested basic guides to conceptual layout of screens, and colours and symbols protocols. Whilst these techniques may be useful for certain single-screen multimedia artworks, their application to the art context is limited, where issues of speed and 'correctness' may not apply.

5.2.2 Educational multimedia evaluation

A specialised area of crossover between computer science and education has been in the 'testing' of educational software interface design, which again shows little agreement, but has been explored for some years (see Smith's *Cybernetic Principals of Learning and Educational Design* 1966 for example). Amongst others, Sheffield University Department of Information Studies (1993) have tested theories that different people learn, and hence use multimedia/hypertext in different ways. They separated people into 'serialists' and 'holists' who tend to approach bodies of information in linear or non-linear ways, and hence show different patterns of software use (this may inform thinking about how audiences may approach artwork differently in galleries).

Particular studies include: Those which concentrate mainly on the internal patterns of use of software (Allinson, 1992; Barker *et al* 1994) and therefore use mostly software logging and controlled observation; and those which take a wider classroom view (Perzylo, 1993; Edwards and Holland, 1992) and include pre-and post-testing, and behavioural field analyses.

Some theorists have concentrated on developing the methodologies themselves for new technology in education. Knussen *et al.* (1991) in particular have explored six different approaches: Classical Experimental, Research and Development (Industrial), Illuminative, Briefing Decision-makers (political), The Teacher as Researcher and The Case-Study Model. Of these, the 'Illuminative' model could perhaps be most usefully applied to the purposes of this dissertation, which unlike a classical experimental approach is appropriate in 'situations which include social interaction', and 'when aiming to discover what happens to an innovation in practice.' (p.15). The method of combined observation and interview or questionnaire can perhaps be applied to interactive artworks.

The aims of art are of course not the same as education, in fact, the educational aims of setting ideas out in the most clearly understandable way are perhaps the opposite to the values of much 'serious' art. In art, metaphor and symbolism are often used rather than direct explanation. However, the illuminative methodology, the acknowledgement of social factors in classroom use, and the recognition of diversity in ways in which computers are used can perhaps be usefully applied to these case studies.

5.2.3 Museum exhibit evaluation

The evaluation of hands-on interpretative or educational exhibits in museums and galleries is reasonably established. It sits in the context of evaluation of general visitor demography and non-interactive displays (Beer, 1987; Loomis, 1973; Melton, 1992; Wittlin, 1971). McManus, for example, has done studies of visitor behaviour ranging from label reading to memory and retention (1987, 1989, 1993).

Of the material covering interactive exhibits in particular, some are general discussions of issues (Mellor, 1991; Bearman, 1993; Beardon, 1993) and some are informal observational reports, such as Winterbotham's (1993, p.17)

warning that 'An interactive exhibit may blight involvement in other exhibits within a radius of several metres.' and Zelevansky's (1995, p.142) comment that 'Those who press, spin or pound the trackball seem to expect some undefined burst of stimulation, and when they do not get it, they move on.' Miles (1988) from a wide experience of museums, suggests that computer based exhibits should have a challenge (with a clear relevant goal), a fantasy (providing a useful metaphor), and should appeal to sensory and conceptual curiosity. He also offers basic practical advice;

> Computer-based exhibits are undoubtedly popular. It is helpful therefore to provide two or three consoles for each programme, and to restrict the length of the programmes to 5-10 minutes. However, interaction is not limited to individuals operating the console, and often discussion takes place among a group before the decision is taken to press a particular button, for example. (p.97).

Of the material which presents more formal studies and figures, some concern single-screen computer-based multimedia, whilst others cover educational hands-on science-type exhibits of a variety of media:

Concerning computer multimedia, Murrell's (1991) research included an observational case study of the interactive educational videodisk *Sculpture Interactive* (about Henry Moore) at Tate Gallery Liverpool, which revealed that only a small percentage of people (and an even smaller percentage of women) would stop and use it without watching someone else first.

Cognitive Applications (1992) made a study of their software on the twelve terminals in The Micro Gallery, a special room within The National Gallery, London. The software was a multimedia database and educational resource of the Gallery's collection and the study was mainly voluntary questionnaires and some observation. People used the terminals singly or in pairs, and their average reported use time was 23 minutes. Around half the users had come to the Micro Gallery to find some specific information, around half were using the Micro Gallery 'in the course of their studies' and around 80% had been to the National Gallery before, suggesting that use was rather more formal and purposeful than that which might result from computer terminals which may be in a normal gallery context for 'passers by'.

Of those studies which concern hands-on interactive exhibits of various media, the Science Museum in London perhaps has the most comprehensive collection. Walasek, Mitchell and Bicknell's (1993) report concerned a *Science Box* exhibit, which included conventional displays, a 'feely box', a video, an artist in residence, and an interactive computer game. The study included observation of movement and use times, plus guided questionnaires. The findings included the fact that of eight exhibits, the computer game was stopped at most (it was also, interestingly, both second place in the 'liked most' list, and first place in the 'liked least' list). On every occasion when people stopped but did not interact, someone else was already interacting with the computer. (p.28).

The Launch Pad at the Science Museum comprises some 15 to 68 interactive exhibits of various kinds, and has been studied in various ways: Mitchell and Bicknell's (1994) report draws on extensive observation and questionnaires. Amongst their findings were the average (mean) of 3.5 minutes spent at each, and some useful conclusions that:

> Enjoyable exhibits are those which:
> - have a high attracting and holding power;
> - enable or encourage social interaction;
> - do not require or encourage label reading;
> - are technology based;
> - involve a higher degree of interaction (number of operations involved in using the exhibit). (p.2).

Stevenson's research on the *Launch Pad* (1993, 1994) specifically concerns groups with children, and in particular examination memories as a measure of retention of information. He usefully summarises some previous studies in museums (1993, p.35*ff*), and presents information from observation, questionnaires and structured interviews. He also compares some selected experts' predictions on certain questions, with the results that he obtained. In studies of 20 tracked users, he reports average interaction times of 65 seconds for each exhibit, and develops measures of 'overall popularity' from observation and questionnaire feedback. He concluded that 'there are no simple features or characteristics which guarantee popularity to an exhibit.' (p.206) but discovered diverse gender and age differences in judgements about which exhibits were 'impressive', meaning that judgements were spread and 'every exhibit is a favourite with at least some of the visitors.'

As for durations of use by visitors, Stevenson found few gender differences, but found that 'Children spend approximately twice as much time interacting as adults.' (p.205). He also found that there was considerable recall and understanding of the exhibits and their subject matter six months after the museum visit, which reinforces the educational claims for interactive exhibits, or perhaps in an art context, the possibility for lasting ideas to be communicated.

5.2.4 Art exhibit evaluation.

The evaluation of art exhibits as opposed to educational exhibits is less straightforward, and some differences are explored in Shettel's (1973) 'Exhibits — an Art Form or Educational Medium?'.

There is an active 'anti-evaluation' attitude in some galleries, with an argument that evaluations of the 'quality' of art can only be a ridiculous, populist and simplistic exercise. Studies concerning judgements of artistic quality tend to be rather arcane, such as Fechner's very early 1897 attempt to measure visitor reactions to works of art, and Cameron's (*et al*) 1969, 'examination of the thematic and stylistic qualities which the public prefers in Twentieth Century art'. Some public responses to public artworks have been collected, but the studies are often just as much a source of contradiction as the artworks themselves. The most common practice concerning the evaluation of art exhibits seems to centre on the monitoring of audience demographics and general behaviour, (Nash, 1975; O'Hare, 1974). Berleant's useful 'The Museum of Art as a Participatory Environment' (1990), is not necessarily based on observational studies, but argues that the environment for viewing sculpture and painting should 'invite movement' as interactive science exhibits do, encouraging '... an active perceptual engagement with the art work ... in short, an engagement of the total person.' p.35.

Published material concerning use of contemporary interactive computer-based art seems largely confined to some artists' informal observations of their own artwork:

> An interactive work demands much more attention. A work like *Legible City* asks for at least ten minutes, and even after an hour or more... (Shaw, 1995, p.73).

> People entered the installation and set about verifying the predictability of the system. They made a gesture, as a question to the space, and mentally noted the sound that that gesture had made. They repeated the gesture once or twice, again as a question, and got the same result. The third repetition seemed to satisfy the participants that the system was in fact interactive. The way they held their body and the look on their face changed. They made the gesture again, this time as a command to the system, not a question. The physical dynamics of the command gesture was significantly different from the previous, more tentative questioning gestures, and the system responded with a different sound. (Rokeby, 1995, p.148).

These snippets of useful observation can give clues as to the wide range of different modes of interaction, but for the most part any study of interaction with these artworks starts from an uncharted plain.

5.3 Case study methodology

> Intuition, innovation, subjectivity, risk, experiment and practice is embedded in the process of 'creation'. Human responses to these 'creations' (be they works of art or products designed for specific functions), are also governed by equally complex systems. (Gray and Pirie, 1995, p.6).

> 'They call on you to sort of participate in it. I'm not one for that sort of thing. I just like to stand and look at things rather than take an active part in it.' male visitor from Chorley, from a study of interactives in the Maritime Museum (Mellor, 1991, p.109).

It was a great challenge to design a methodology for a meaningful study of interactive art pieces, particularly as there is little relevant data from which to start, and a very wide range of variables. As the man from Chorley illustrates, we can't even assume that people like to interact in the first place. The idea of recording data concerning an artwork, stopwatch in hand, may strike first of all as an inherently ludicrous exercise. To some extent it always will be. However, these Case Studies were intended not to attempt a scientific measure of 'quality' but rather to gather some information on some aspects of audience behaviour, which may or may not be useful to artists and curators.

Because of the lack of existing information, it was decided to cast a fairly wide net for the first case study, basing methodology mostly on museum exhibit evaluation. At this stage, the major queries for the Case Studies were (CSQ — Case Study Query):

CSQ1 Do visitors to art galleries choose to interact with interactive exhibits?

CSQ2 Approximately how long do gallery visitors actually spend interacting with interactive artworks? (Although this is a primary bit of information which artists need to think about, there is very little, if any, hard data available on this in art contexts).

CSQ3 What kinds of things might influence the duration of use? Obviously there are a great many possible factors, so as well as gathering more general information it was decided to concentrate on particular areas of interest including:

- gender.
- the affect of other people 'waiting'.
- possible intimidation factors.
- the difference between individual and group use.

These queries were the ones considered most useful to inform practice for an artist or curator dealing with interactive work.

Observation seemed an obvious starting point, with some useful observational tracking methodologies from museum exhibit evaluation (Stevenson, 1993; Murrell, 1991 etc.). It is also possible to build in tracking systems to interactive multimedia programmes themselves, so that a record is kept of 'where the viewer went', where they clicked on screen, and when. However, this would not necessarily illuminate the queries, which related as much to what happened when the viewer was *not* engaging, as when they were actually 'hands-on'. Tracking various individuals throughout their time in a space, rather than observing the exhibit, was decided on for this purpose.

However, observation alone did not seem to address the questions fully. After all, the amount of time spent on an interactive artwork may involve many different reasons. Viewers may spend a long time using it because the artwork is fascinating, or because it is so difficult to use that it takes a long time to 'get anywhere'. Artworks may vary greatly in the quantity and scope of the content, which determines 'how long it takes to see/get it all'. Audiences may spend a long time with an artwork because there is a lot to see, or because they spend a long time pondering the meaning of one image.

Alternatively, they may spend a short time with an artwork because they're in a draught, because their child is screaming, because they find the content boring/offensive, because they feel self-conscious, or because they don't like the colour blue.

Obviously, all the variables and factors cannot be covered by any one study, but having a questionnaire to match to each observed person may shed some light on their behaviour as related to demographics, and to their own judgements on the artwork.

When the studies were finished the data was transferred to a computer database (FileMaker Pro) so that observation and questionnaires could be matched up, averages taken, and data compared and analysed. Graphs and charts were produced from this data using Excel.

Observation:

The sheet for recording observation data (see Appendix IIIc) included sets of boxes to record the amount of time spent on various activities, and the order of these activities. There was also a set of boxes to record certain factors which applied during these activities, namely, whether the subject talked/verbally interacted with other people during each activity (and if those people were people they entered the gallery with, or not), and the number of people waiting for or using the artwork(s).

The timings were taken with a stop-watch and written onto the sheets.

Some of the categories for activities were more difficult to define than others. For these purposes:

- 'using the artwork' was defined as touching (or otherwise working) the equipment which formed the interface of the artwork, and appearing to pay attention to it. If subjects were sharing an artwork (for example taking turns at working the mouse, but paying attention when the other person was working it), then they were still recorded as 'using' throughout the collective use.
- 'watching/waiting' was defined as standing within 3 metres of the artwork's point of interaction, looking towards the artwork. (McManus, 1987a, uses a measurement of 2.5 to 3 metres frequently in her observational work in

museums, i.e. behaviour if strangers are within 2.5m of each other etc., so this measurement was a useful approximation of 'proximity')

- 'interacting with other people'. The observed person was defined as doing this if they exchanged facial expressions, hand gestures, lip movements or words with any other person.
- 'alone' — the subject was recorded as 'alone' if they entered the observational area alone.
- 'with others' — the subject was recorded as being 'with others' if they entered the observational area with other people who they appeared to know. The number, gender and adult/child estimate (a 'child' if the person appeared to be under 16 year old) was recorded for all people with the subject.
- 'stranger' — a person who the subject did not enter the observation area with, and did not appear to know (e.g. if they left with the subject, or appeared to be intimate with the subject then they were assumed *not* to be a stranger, even if they did not enter with the subject.)

Questionnaires:

A basic questionnaire was devised (see Appendix IIIc, Figure 63 and Figure 64) to gather some basic demographic information, to question the viewer's experience (for example, a question on whether or not they felt intimidated) and to elicit some 'judgements of quality' about the work itself (level of interest, etc.). In each case the person was approached as they left the gallery, with a standard speech ('I'm doing a survey on these artworks, would you mind filling in a short questionnaire?'), and if assenting, were handed the questionnaire with a clipboard and pen and asked to fill it in themselves. The questionnaire information was transferred onto each individual's observation database record.

Judging the 'quality' of works of art is always difficult without reverting to jargon, but the questions confined themselves to fairly basic qualities such as 'interesting', 'boring' etc.

Most responses were arranged on a five-point scale, so that responses could be scored 1-5 and averages taken.

Comparing predictions with results:

Because duration of use of an artwork depends also on the 'amount of content' of the work, before starting each case study I carefully looked at the artwork and made an estimation of how long I thought it would take to 'see most of the artwork' and the minimum time needed to get 'a reasonable experience' (i.e. to discover the major points of the work). This is obviously a very subjective judgement, but provides one point for comparison.

It was also decided that once the case studies were done, it would be useful to compare the artists' own predictions about the use of their artwork with the results of observation and questionnaires.

Overall, it should be stressed that because of the range of variables involved, it is unlikely that strict universal scientific conclusions can be drawn from results and comparisons. The 'repeatability' of the studies will always be prone to different audiences, surroundings, weather etc. The case studies and results should be seen perhaps as 'hypothesis generating activities' rather than attempts to 'prove' any particular idea; as initial steps which may suggest more detailed studies.

Chapter 6 Case Studies 1 and 2

6.1 Case study 1: *Silver to Silicon*, at The Watershed, Bristol

The first case study carried out was intended to obtain some basic information about the behaviour of audiences using interactive artwork. *Silver to Silicon* was chosen because it was an artwork based on interactive multimedia — a screen based set of media which are interacted with by 'point and click' with a computer mouse (or touch screens on the computer monitor). Interactive multimedia is one of the more widely available forms of interactive media, usually distributed on a CD-ROM. Commercial products such as encyclopaedia or electronic books are starting to become familiar to a general public.

6.1.1 The variables

The gallery:

Watershed Gallery One (see Figure 7). A small visual arts gallery in arts complex including cafe/bar, conference facility and cinema.

Past shows in the gallery include: Documentary photography from South Africa, an exhibition of quilts show, etc. — a fairly 'popular' programme.

The gallery itself is approximately 12m by 8m of traditional 'white-walls' gallery style, along a short corridor from the cafe/bar space.

The audience:

The daily gallery audience count was examined. Up to the 11th August the head count was 3,065, making an average of around 440 people per week, 63 per day, 8 people per hour. There was no note made of gender, age etc. of the audience.

Because of the variety of other events nearby, the gallery has a certain amount of viewers who just 'drop in to see what's on' rather than making a special trip to see an exhibition.

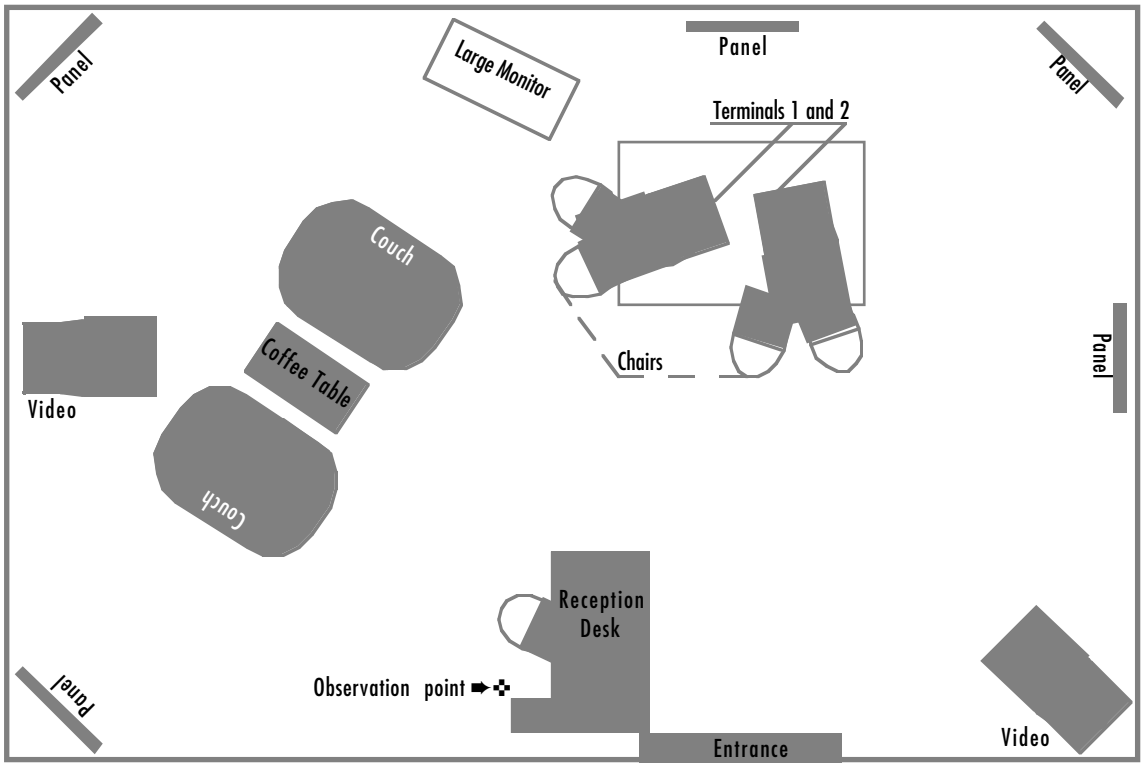


Figure 7: Diagram of Watershed Gallery.

The artwork:

Silver to Silicon is a collection of eight interactive multimedia artworks, each by a different artist/group of artists (see also Appendix I). The works all concern issues surrounding new technology in relation to photography, and are presented with a browser and historical introduction. All used 'point and click' navigation. The version of *Silver to Silicon* exhibited at the Watershed was in fact only a prototype of the finished CD. The overall introduction and navigation was also improved for the final version.

The whole work was presented on two 'normal' computer terminals with 14 inch colour screens, headphones and a mouse. The exhibition space as a whole consisted of wall-panels, three video 'trailers', tables with office chairs and two computers, one linked to a larger (30 in.) video screen. The were also two sofas forming a 'waiting' area complete with magazines, making for a very 'domestic' environment (see Figure 8 and Figure 9). My estimation of how long the viewer needs to 'see most of it': 1 hour 45 min. How long is needed to get a 'reasonable experience': 15 minutes.

Figure 8: Installation shot of *Silver to Silicon* at Watershed Gallery

Figure 9: *Silver to Silicon*; detail of one terminal at Watershed Gallery installation.

6.1.2 The methodology for the case study at The Watershed

Research was carried out over a three day period, Thursday 11th — Saturday 13th August 1994.

Observational Research:

Observational research was carried out on 34 people entering the gallery over the three day period. The people were selected systematically, being the first person to enter the gallery, three minutes after the last observed person had left the gallery space. The observation was done by the author — positioned behind a side invigilator's desk, with stopwatch not visible, so that it was not obvious that observing and taking notes was taking place.

Questionnaires:

The 34 people were approached as they left the gallery, and asked to fill in a questionnaire. Ten people refused (all of these were people who had not had hands-on use of the computers), most commonly saying that that they didn't have time. Two people who did not have hands-on use of the computers did fill in a questionnaire, but were obviously not able to responsd to judgements concerning use of the work. Thus there were 22 completed questionnaires plus two part-completed ones. For those observed subjects who would not fill in a questionnaire, their genders and ages were estimated from observation.

A questionnaire had been designed for use at the Watershed, but the gallery preferred to use one designed by a consultant for them (see Figure 63, p.197). Their questionnaire had been filled in by the audience on a voluntary basis throughout the showing of the exhibition, and about 130 of them were available for reference. As their questionnaire covered the questions which would have been posed, and also provided the opportunity to cross-check my sample against a larger pool of data, their questionnaire was used (selecting for analysis only the questions relevant to my research).

6.1.3 The results and conclusions

See Appendix III for data on all case studies.

A) RESULTS FROM QUESTIONNAIRES

Demographics of sample:

The proportions of genders and ages in the sample are recorded in Appendix IIIa (Fig. 44 p.178), and are primarily recorded for comparison with other samples of other case studies.

Qualitative judgements:

The options for responses concerning quality on the questionnaire are rather limited, but the majority were positive (see Figure 10). However, 23% (5 of 22) thought the work "slow" in the qualitative judgements, suggesting the need for considerable editing and re-pacing. In the space for comments, many people mentioned lack of escape routes from long slide-tape sequences as a problem.

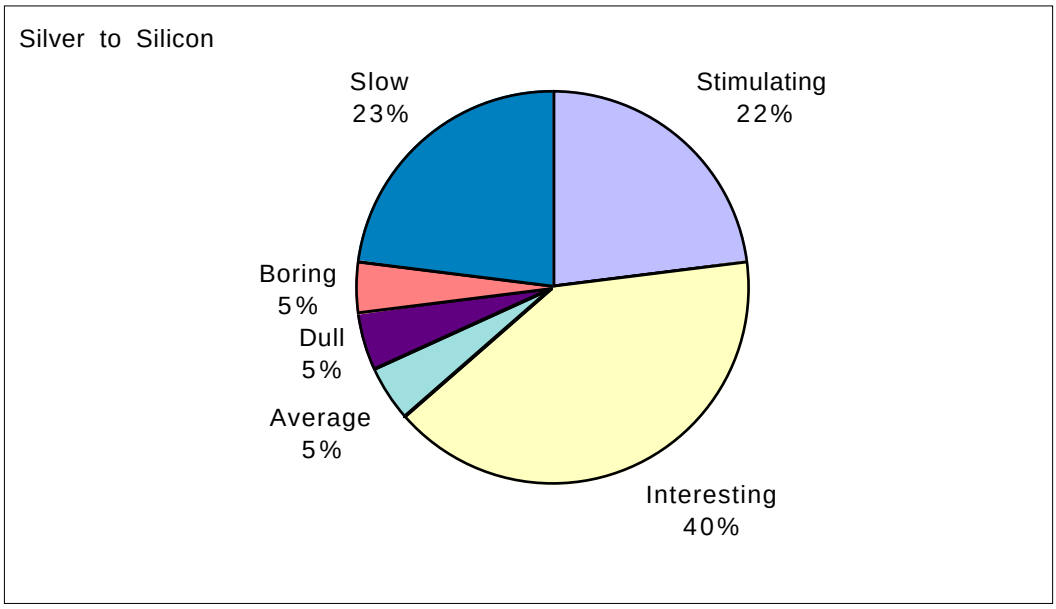


Figure 10: *Silver to Silicon*; responses on quality of work

Figure 46 (p.180) shows responses to question 4: 'Did you find the "point and click" way of "navigating" the work:' 23% (5 of 22) found it 'difficult' (no-one, however, found it 'very difficult'). In response to question 5a 'Did you feel in control of your journey through the work?', only 5% (1 of 22) responded 'In complete control'. Averages were taken from these responses by finding the

median, giving an average of 'easy' for question 4 and 'partial control' for question 5a.

In response to the question 'Did you find the large screen projection showing your actions to others intimidating/embarrassing?' 9% (2 of 22) of people responded 'yes' (Figure 47, p.181).

B) RESULTS FROM OBSERVATIONAL RESEARCH

Did people use the artwork?

65% (22 of 34) of those who entered the exhibition area used the computers. Of the 35% who didn't use the computers:

In less than 30% of cases were there no computers available to use.
They spent an average of 6 min 51 sec in the exhibition area.
They spent an average of 3 min 9 sec watching/waiting.
67% of these subjects came to the gallery alone.

Of the people who approached within 3 metres of the computers, 19% (5 of 27) did not use them.

Gallery invigilators would approach anyone who was 'hovering' near the computers for more than about 30 seconds and offer help to get them started. Those who refused the offer usually said that they didn't have time. Some people, however, did not go near the computers at all and quickly skirted round the wall-based images, and watched others on the computers, before exiting. All of the people who declined to fill in a questionnaire were people who had not used the computers, and all stated that was because of 'lack of time'. The reasons why people did not engage with the computers therefore are unconfirmed but are perhaps more likely to do with lack of time to engage, rather than intimidation, or because the computers were in use etc. Whether the figures of 35% or 19% for 'non-use' are examined, this is some cause for concern, as these people did not use the artwork at all. These figures would be interesting to compare with other gallery situations and different artworks.

For how long did people use the computers?

The average (mean) time spent on the computers by those who used them was 18 min. 18 sec. (sample standard deviation 20 min. 07 sec.). The histogram (see Table 2, p.183) shows a declining curve with a fairly long 'tail'. The maximum time observed was 1 hr. 30 min. 30 sec. No-one who used the computer, used it for less than 30 sec. Therefore, once people had hands-on use of the artwork, there appeared to be little 'dabbling' or giving up quickly.

How did they use it?

The average (mean) time spent waiting for/watching the computer from a distance was 7 min. 15 sec. The maximum time observed was 18 min. 50 sec. Because of the steady flow of a small number of people visiting the gallery, there were rarely any more than two people waiting during the observation.

C) FACTORS RELATING TO DURATION OF USE

Questionnaires:

Demographic

Gender did not appear to greatly affect the amount of time people used the computer (males average 19 min. 47 sec., females 16 min. 49 sec.). A breakdown by age, and by frequency of computer use showed no consistent patterns (see Figure 11, next page). Those who thought the work 'easier to use' tended to show longer than average use times, but patterns concerning responses on 'level of control' did not mirror this pattern.

Those who found having their actions watched 'intimidating' spent considerably less time than average. (However, only 9% (2 of 22) of people thought it intimidating.)

Judgements on quality of artwork

Unsurprisingly, those who thought it 'stimulating and thought provoking' used the work for longer average times than those who thought it 'interesting',

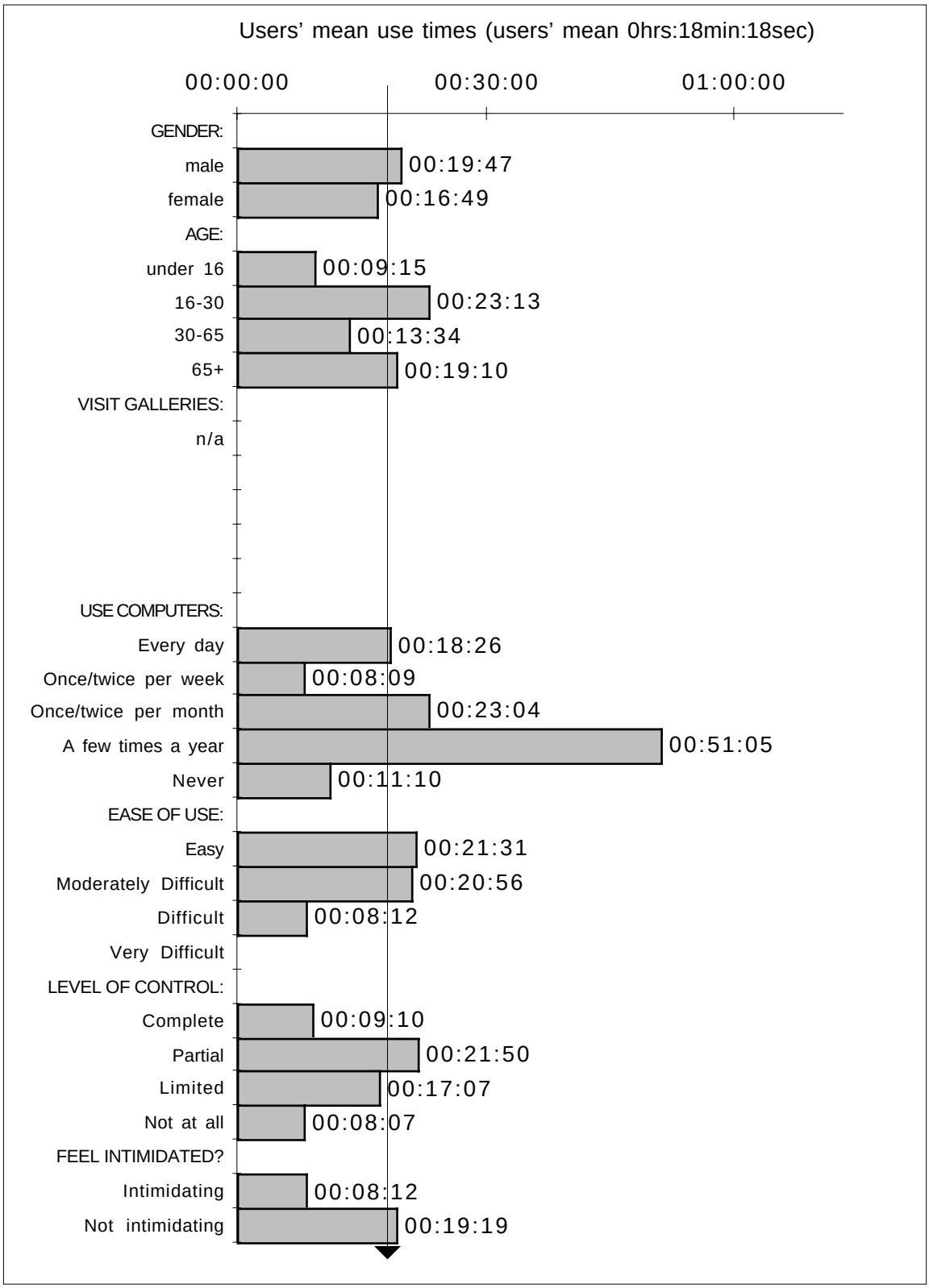


Figure 11: *Silver to Silicon*; how questionnaire responses relate to average duration of use.

'average', 'dull', 'boring' or 'slow' (see Figure 12). There could therefore be some kind of correlation between positive quality judgements and longer use times (as opposed to, for example, longer use times just linked to not being able to work out how to use something). However, those who thought it 'slow' used it for longer average times than those who thought it 'interesting', 'average', 'dull', or 'boring' so perhaps additionally there is an unsurprising correlation between things which are 'slow to use' and longer use times.

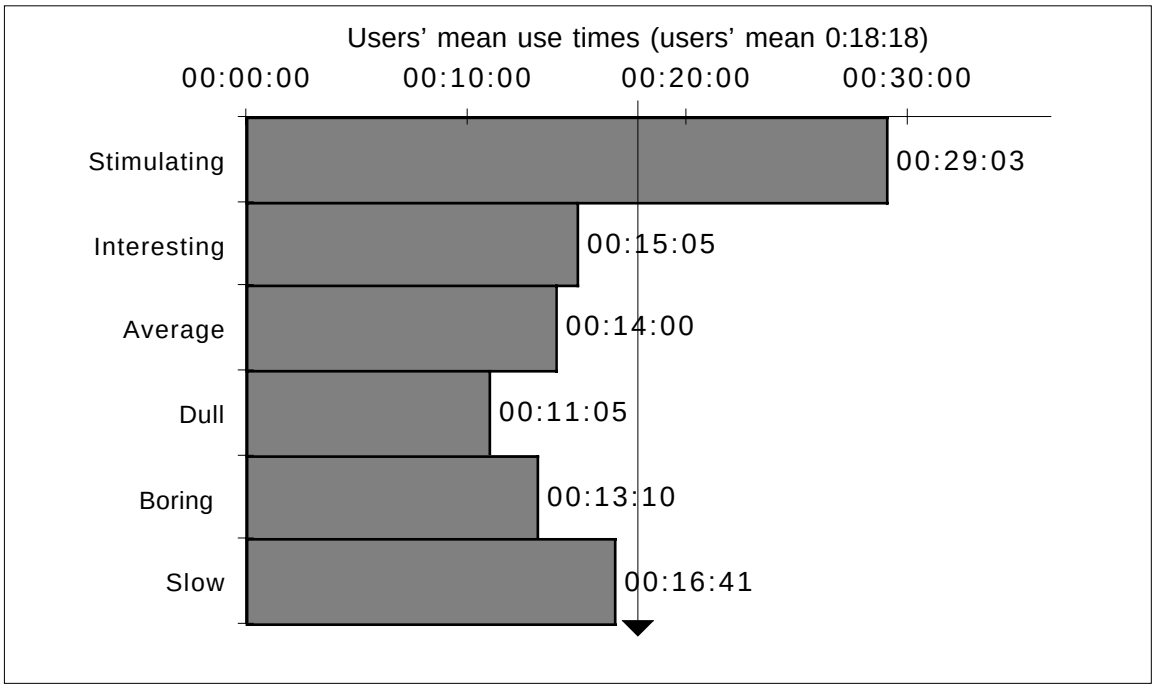


Figure 12: *Silver to Silicon;* judgements of quality related to use times

Observation:

Social interaction

Social interaction during use was surprisingly common — 50% of all users (11 of 22) did so (see Figure 58, p.192). Although only one person talked to a stranger (somebody who he/she didn't arrive in the gallery with), of those who came to the gallery with other people, and used the computer, 69% (11 of 16) talked to each other whilst doing so. Those who came with other people often chose to share a computer, even though there was another computer vacant for them to use (in 10 of the 11 cases).

Those who interacted with other people spent shorter (see Figure 13) average times using the artwork than those who did not. Those who came to the gallery with others spent shorter average times using the artwork than those who came alone. However, if those people who came with others are examined, those who did interact with other people spent longer average times using the artwork than those who did not interact with other people.

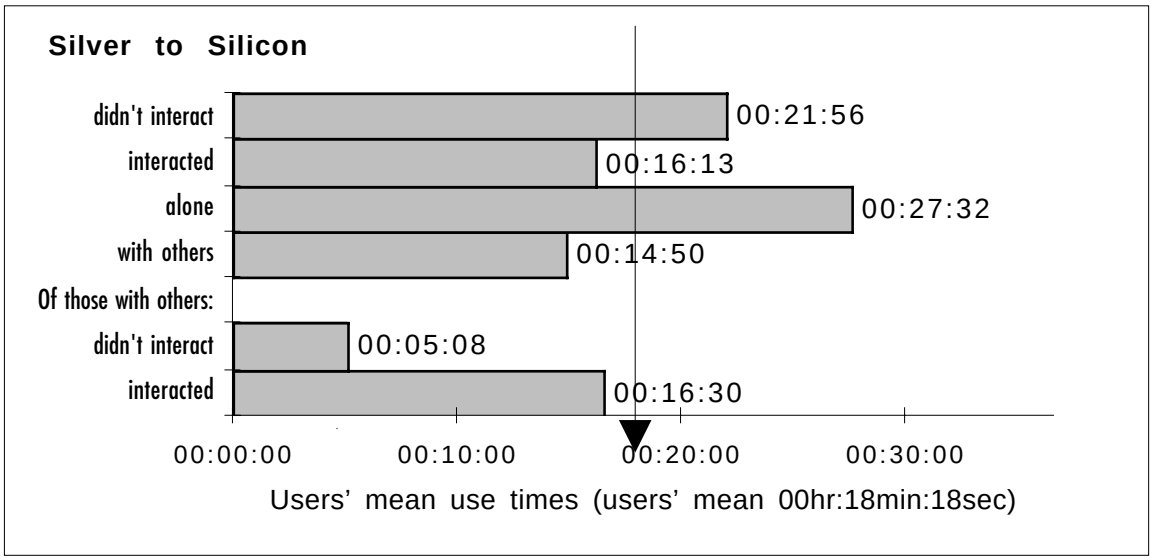


Figure 13: *Silver to Silicon*; Social interaction and average use times.

General conclusions:

From the first case study, some useful points could be concluded:

- A majority of those who entered the gallery used one of the computers to interact with the work. Of those who didn't, lack of time seems to be a more common reason than being unwilling to wait for a vacant computer.

- Only 9% responded that they felt that having their actions seen by others was intimidating/embarrassing, but those that did spent shorter times than average using the artwork.

- Many people felt the work was 'easy to use', but only 5% (1 of 22) felt in 'full control'.

- Despite some responses on the questionnaires from the 'critical' end of the spectrum, the viewers seemed to spend a considerable amount of

concentrated time on the work, not to mention lengthy periods of time waiting for a computer to become available.

- Surprisingly, viewing the work did not appear to be an exclusively solitary experience, even though terminals were designed to be used by only one person. People interacted and talked with other throughout use of the computers, and appeared to enjoy sharing terminals (perhaps for 'moral support', perhaps for other reasons).

- Of those who came with others, those that interacted with other people whilst using the artwork used it for longer than average.

6.2 Case study 2: Three artworks in *V-Topia*, Tramway, Glasgow.

Based on the methodologies and conclusions from the case study of *Silver to Silicon*, the next set of case studies attempt to apply the study to a wider variety of types of interactive works, but with a smaller range of variables studied. All of the artworks in this show used installations which differed from the 'computers on a table' approach of *Silver to Silicon*. The aim was to compare data on different modes of interaction, to see if the patterns suggested by *Silver to Silicon* are applicable to other artworks.

The most surprising discovery overall was the extent to which people used an artwork together rather than individually, and it was decided to pay particular attention to this factor.

6.2.1 The variables

The gallery:

The Tramway is a large ex-tramshed building used as contemporary art gallery and modern music/opera venue. Past shows include Christian Boltanski, and its past programming has been less 'popular' in aim than the Watershed Gallery. However, curators stated that the audience for this show had been 'wider than usual' for the gallery, as the press coverage had been wider and more 'popular'.

The building is in a mainly low-income residential/decaying industrial area, with no surrounding shops, so unlike the Watershed Gallery people tend to have to make a 'special trip' to see an exhibition, rather than dropping in whilst doing something else. The environment was the very opposite of the 'domestic' atmosphere created for The Watershed Gallery; The Tramway is a cavernous, high-ceiling place, darkened for the exhibition, and echoing with the sounds of building work. The atmosphere was 'industrial/night-club'.

A major difference in the dynamic of this exhibition in comparison to The Watershed was the fact that it was a group show of ten different installations rather than one installation (see Figure 14). This meant that any dynamic of 'waiting' was very different: people tended to drift on to the next exhibit and possibly come back later if one exhibit was 'engaged'.

The audience:

The daily audience count kept by the gallery was examined. Up to the 9th September the head count was 3907, making an average of around 651 people per week, 130 per day or 22 people per hour. This is three times the Watershed audience density of 8 people per hour, but if the fact is taken into account that there were 10 exhibits at the Tramway and 2 computer terminals at the Watershed, that makes an average audience density of:
Watershed: 4 people per exhibit per hour
Tramway: 2.2 people per exhibit per hour

The artwork:

V-Topia is an exhibition of 10 interactive computer-based artworks, including:

Sonata by Grahame Weinbren.

A screen-based interactive narrative (computer-controlled videodisk) activated by pointing at areas of screen with finger or hand (touching the screen is not necessary). The installation (see Figure 15) consists of a chair and 14-inch screen where the user sits within an area 'protected' by stretched nylon filaments, attached to a 'tower'. The tower contains two monitors, pointed away from the user, where others can watch the on-screen happenings and hear the dialogue/monologue.

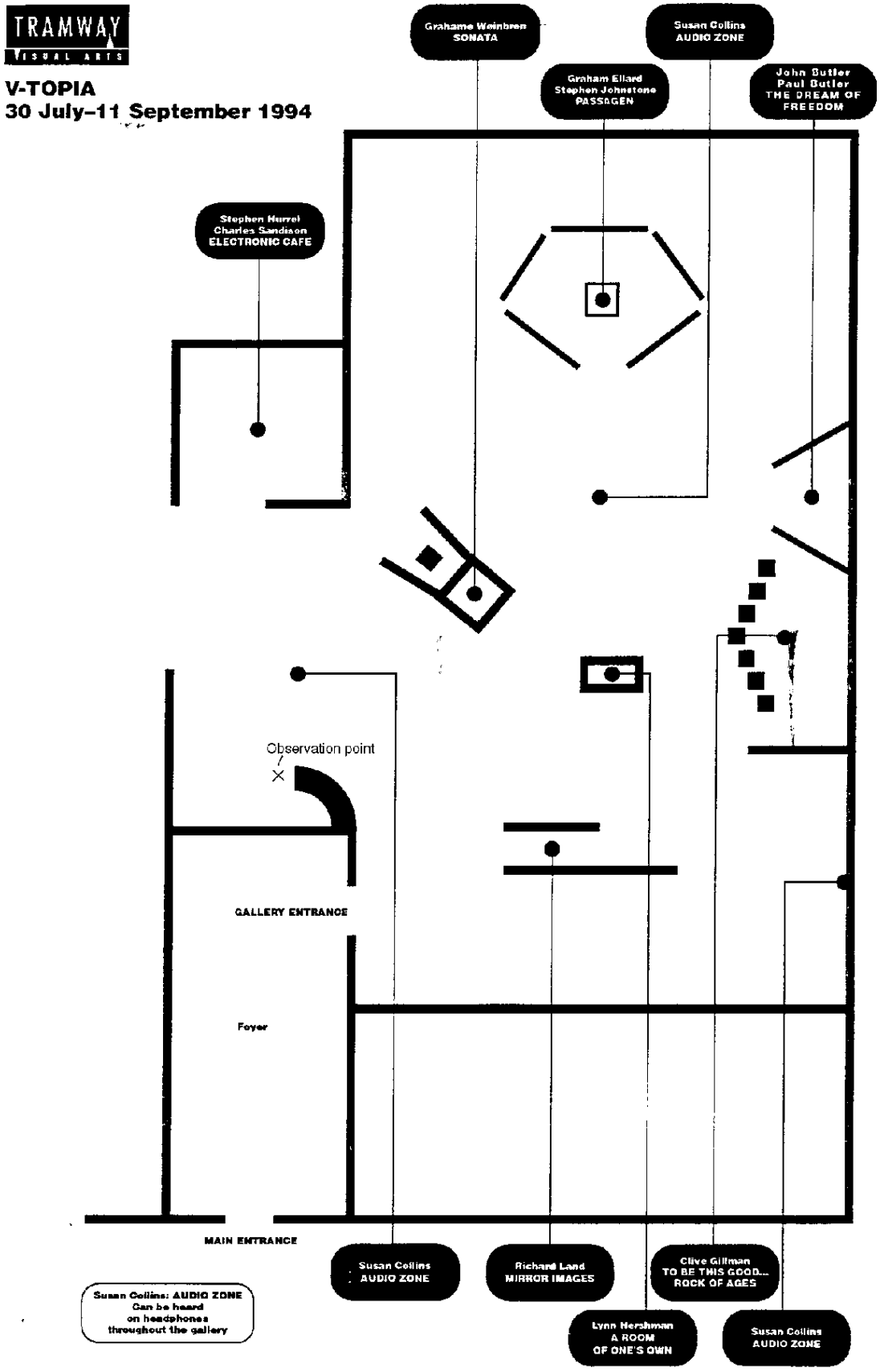


Figure 14: Diagram of layout of *V-Topia* at The Tramway

The subject matter concerns two narratives: *The Kreutzer Sonata* by Tolstoy, where a jealous husband kills his wife and her music teacher, and tells the story on a train. The Bible story Judith and Holofernes, where a young widow seduces the general who is laying siege to her town, and cuts off his head with the help of her woman servant. The viewer can fairly smoothly control a set of video sections with some historical images, live action and dialogue, moving forward and backward in time, and choosing male or female points of view (see Figure 16).

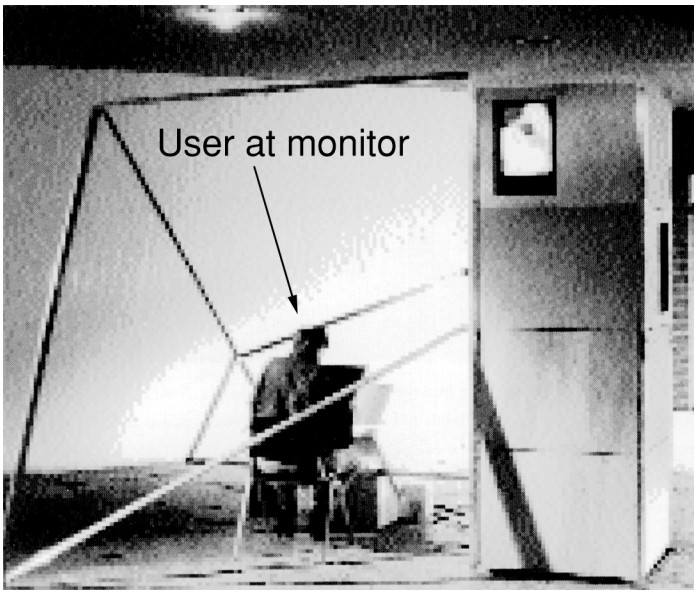


Figure 15: Installation shot of *Sonata*

Figure 16: A screen image from *Sonata* (original in colour)

{VIDEO CLIP ON CD} 1: *SONATA AT V-TOPIA*

My estimation of how long the viewer needs to 'see most of it': one hour. How long is needed to get a 'reasonable experience': seven minutes.

Audio Zone by Susan Collins.

A headphone and video projector piece which is triggered by the viewer walking into certain areas of the exhibition space (see Figure 17). Viewers had to pick up a set of headphones from the gallery invigilator's desk and sign for them. The invigilator made sure they were worn the right way round, and receiving correctly, and explained that the viewer had to walk around the space to pick up the different sites. Due to a common misconception, the invigilator also explained that the headsets were *not* a 'guide to the exhibition'

Figure 17: Installation shot of *Audio Zone* (a projection in background).

{VIDEO CLIP ON CD} 2: *AUDIO ZONE* AT *V-TOPIA*

This installation consisted of four 'sites' scattered between the other artworks, with simple projected images, and a stereo/3D soundtrack of mixed and seductive male and female voices, mostly Scottish. The sites include a bench where hands appear and the soundtrack encourages users to sit down. If you do,

the projected hands touch your thigh. Another site produces a very large wall projection of a keyboard button, navel or nipple. All sites concern the human body, seduction and technology.

My estimation of how long the viewer needs to 'see most of it': 15 minutes. How long is needed to get a 'reasonable experience': five minutes.

Mirror Images by Richard Land.

A video camera/computer piece where standing in the right spot in front of the monitor causes a moving image of your own head and shoulders to appear on the monitor, with some video effects. After a while images from past people appear, superimposed on your image (see Figure 18).

Figure 18: Screen shot from *Mirror Images*; two superimposed heads.

{VIDEO CLIP ON CD} 3: *MIRROR IMAGES* AT *V-TOPIA*.

My estimation of how long the viewer needs to 'see most of it': 8 minutes.
How long is needed to get a 'reasonable experience': 3 minutes.

6.2.2 The methodology for the case studies at The Tramway.

The research was carried out over a three day period, Thursday 8th - Saturday 10th September 1994.

The specific exhibits chosen used a range of levels of and types of interaction: Graham Weinbren's *Sonata* is a 'sit down' exhibit where interaction is primarily a different means of viewing his work. Susan Collins' *Audio Zone* with a similar level of interaction, but triggered by large physical movement rather than hand movements, and Richard Land's *Mirror Images*, where the viewer can have creative input into the work. *Sonata* was my main area of research — the exhibit most comparable to *Silver to Silicon* in Case Study 1.

Sonata: 32 people were tracked and asked to fill in questionnaires, four people refused, so 28 questionnaires were obtained.
Audio Zone: 22 people were tracked and asked to fill in questionnaires.
Mirror Images: 22 people were tracked and asked to fill in questionnaires.

Observational Research:

The people were selected systematically, being the first person to approach within 3 metres of the exhibit, three minutes or more after the last observed person had left the exhibit. If an observed person returned to the exhibit, they were observed for every visit.

The observation was done by the author, positioned behind a side invigilator's desk, with stopwatch not visible, so that it was not obvious that observation and taking notes was taking place.

The observational research differed from the Watershed observation in the following ways:

For these case studies the observation sheet was narrowed down and simplified (see Appendix IIIc) into the activities of:

Watching/waiting.
Using the artwork.
Wandering (somewhere else in the exhibition).
Other.

Each with accompanying notes on:
How many other people were watching/waiting.
How many other people were using the artwork.
If the subject interacted with other people, and if they had entered the exhibition with these people.

The definitions of these activities (see 5.3) remained the same as in Case Study 1.

Questionnaires:

Each observed person was approached as they left the gallery, and asked to fill in a questionnaire (see Appendix IIIc, Fig. 64).

The questionnaire differs from that used for the Watershed Gallery case study in the following ways:

- The age range categories of the Watershed form had a duplication fault, and were changed slightly.
- The question concerning level of 'control': the first category wording was changed from 'complete' to 'full'. As no-one in the previous sample had replied 'don't know' this was omitted.
- As well as recording people's familiarity with computers, it seemed sensible to record their familiarity with art galleries, as intimidation by either could affect their behaviour.
- The recording of judgements concerning judgements on the quality of the artwork was expanded into a set of scales of 'opposites' to try and pick out particular qualities. These could be scored 1-5.
- The wording of the 'intimidation question' was changed to a more general "Did you feel intimidated or embarrassed by the fact that others were watching your actions ?"

The studies of *V-Topia* could not be said to be have identical experimental conditions to the study of *Silver to Silicon* therefore, but some rough

comparisons can perhaps be made at this stage, as a diachronic rather than synchronic study.

6.2.3 The results and conclusions (comparisons of the three *V-Topia* works plus *Silver to Silicon)*

A) RESULTS FROM QUESTIONNAIRES

Demographics of samples:

The viewers who were tracked were systematically selected from those approaching the particular artworks, and for the most part reflect the general demographics of the visitors to the exhibition as a whole, e.g. slightly more men than women. There are some variations to this, however, (Figure 44, p.178):

Age: *Mirror Images* was used by a larger proportion of the older and younger range of people than the other artworks.

Alone/with others: A rather larger proportion of those using *Audio Zone* came to the exhibition alone, compared to the other two artworks.
This perhaps reflects the 'one person' nature of the headphones, and the fact that there may not have been enough headphones available at one time for all of a group, which could have put people off.

Judgements on quality of artwork:

The proportions of responses to these questions can be seen in Figure 46, p.180. As in Case Study 1, 'averages' were taken as the *median* response to the questions of 'ease of use' and 'level of control'.

Ease of use: The responses to *Mirror Images* averaged out to 'easy'. The other three artworks averaged 'fairly easy'.

In my judgement *Mirror Images* could indeed be said to be the 'easiest to use' artwork, as all the viewer had to do was stand in the right place, without any other demands of 'navigation', either physical or mouse/pointer based.

Level of control: *Audio Zone* and *Mirror Images* averaged 'partial control'; *Sonata* and *Silver to Silicon* averaged 'limited control'.

The variation between these judgements shows an interesting level of discernment by the audiences between 'easy' and 'controllable'. They are indeed not the same thing: 'easy to use' seems to depend on the obviousness of 'what you have to do to get it to start working'; 'control' perhaps depends on the more complex design of the interface so that the viewer feels in control of what is happening and 'where they are' conceptually in the work. It is perhaps significant that the two artworks which were navigated by mouse/pointing were deemed less controllable than the two artworks which had more 'whole body' physical navigation. However, perhaps also the internal structure of the mouse/pointing artworks was more dense and complex than the other two pieces, and so control was likely to be more difficult.

'Sliding scale' qualitative judgements: There are few significant or consistent differences in the responses to other qualitative judgements, apart from; *Sonata* was judged less 'interesting' than the other two. *Mirror Images* was judged 'too slow'. *Mirror Images* was judged more 'participative' than the other two (Figure 19, next page).

The judgements on *Mirror Images* are interesting: The audiences, who were from a wide variety of levels of experience of art and technology, perhaps picked up on the major pacing problem of *Mirror Images*: the images of past viewers did not start to appear until around two minutes after the viewer started, and thereafter appeared very infrequently. Many viewers left the piece before the two minutes, and presumably only saw the basic replay of their own face with some video effects. Two minutes is perhaps a long time to stand around in a gallery space, if the artwork is unfamiliar. Unlike a book or a feature film, (or even a video in a gallery, where running time is usually stated), users of interactive artworks are given few clues as to 'how long' an artwork might be.

The judgement of *Mirror Image* as more 'participative' than the other artworks (see previous categorisations of interaction), agreed with the author's judgement: It was the only artwork in which the viewer could have a creative visual input to the content of the artwork (in fact, almost all of the content is

Averaged responses to judgements of quality (scoring 1-5 then finding mean)					
Score	Verbal approximate	Sonata	Audio	Mirror	
			Zone	Images	
1	Interesting				
2	Fairly interesting		•	•	
3	Neutral	•			
4	Fairly boring				
5	Boring				
1	Too fast				
2	A bit too fast				
3	Neutral	•	•		
4	A bit too slow			•	
5	Too slow				
1	Approachable				
2	Fairly approachable	•	•	•	
3	Neutral				
4	Fairly intimidating				
5	Intimidating				
1	Meaningful				
2	Fairly meaningful				
3	Neutral	•	•	•	
4	Fairly meaningless				
5	Meaningless				
1	Too obvious				
2	A bit too obvious				
3	Neutral	•	•	•	
4	A bit too vague				
5	Too vague				
1	Satisfying				
2	Fairly satisfying				
3	Neutral	•	•	•	
4	Fairly frustrating				
5	Frustrating				
1	Participative				
2	Fairly participative			•	
3	Neutral	•	•		
4	Fairly passive				
5	Passive				

Figure 19: *V-Topia* artworks; averaged responses to judgements of quality.

supplied by viewers). The other artworks are more or less just different ways of viewing, rather than ways of having input. This may suggest that the users of these samples have an ability to critically judge some different levels of interaction/participation, and also to identify when problems occur in structure or pacing.

Intimidation: In the responses to the question "Did you feel intimidated or embarrassed by the fact that others were watching your actions?", *Sonata* had the lowest frequency of 'yes' responses, followed by *Silver to Silicon*, then *Audio Zone*, then *Mirror Images* (see p.181, Figure 47). For all of the artworks except *Mirror Images*, more men than women felt intimidated, whilst with *Mirror Images*, it was only women who said they were intimidated.

Again these are interesting results. Before starting the case studies it had been thought that the technology itself might be the major intimidating factor, but the more 'visibly hi-tech/computer' pieces (*Sonata* and *Silver to Silicon)* actually were judged intimidating *less* frequently. The two artworks which had more 'whole body' physical navigation (*Audio Zone* and *Mirror Images)* were judged intimidating more often, even though in *Sonata* and *Silver to Silicon*, the actions of what the viewer was doing 'on-screen' was much more visible to bystanders. *Mirror Images*, where the actions of the viewer 'on-screen' were not visible at all to bystanders, had the highest percentage of 'intimidating' responses, particularly from women.

A factor which does follow the data however, is the level to which the viewers' own bodies are visible to spectators: this was highest for *Mirror Images* where the viewer was literally 'in the spotlight', then next highest for *Audio Zone* where at one point the projections could be onto the viewer's own body, and then the 'sit-down and point' pieces. Perhaps 'body-anxiety' is a more intimidatory factor than 'computer anxiety' here. Women are perhaps specially uncomfortable with looking at their own image, and having other people look at them too.

B) RESULTS FROM OBSERVATIONAL RESEARCH

Did people use the artwork?

Every observed person who approached within 3 metres of any of the three *V-Topia* artworks went on to use it. This compares to 81% of the sample for *Silver to Silicon*. This could reflect the factor that people were perhaps more likely to have made a special trip to visit *V-Topia*.

The duration of use:

Silver to Silicon:
Users' mean use time was 18 min. 18 sec. (sample standard deviation 20 min. 18 sec.). The maximum time observed was 1 hr. 30 min. 30 sec. No-one used it for less than 30 sec., in fact the shortest time was 40 sec.
3% of users did not use the computer in one block, but used it for a time, went away to the rest of the exhibition (and/or watched from the outside), and then returned to use it again.

Sonata:
Users' mean use time was 7 min. 12 sec. (sample standard deviation 6 min. 26 sec.). The maximum time observed was 26 min. 5 sec. Only 1 user (3%), used it for less than 30 sec.
25% of users did not use it in one block, but used it for a time, went away to the rest of the exhibition (and/or watched from the outside), and then returned to use it again.

Audio Zone:
Users' mean use time was 10 min 53 sec. (sample standard deviation 4 min. 58 sec.). The maximum time observed was 20 min.
No-one used it for less than 30 sec., in fact the shortest time was 05:05.
27% of users did not use it in one block, but used it for a time, went away to the rest of the exhibition (and/or watched from the outside), and then returned to use it again.

Mirror Images:
The average (mean) time spent using the artwork was 1 min 52 sec. (sample standard deviation 1 min. 24 sec.). The maximum time observed was 4 min 45 sec. Only 1 user (5% of users), used it for less than 30 sec.
27% of users did not use it in one block, but used it for a time, went away to the rest of the exhibition (and/or watched from the outside), and then returned to use it again.

The 30 second figure was an attempt to ascertain whether there was a 'dabble factor', i.e. whether people would start to engage with an artwork, and then stop because they couldn't get it to work, or other reasons. This appears to have happened very infrequently, and most people engaged for a reasonable length

of time. In looking at the histograms (Table 2, p.183), it might be suggested that there is a smaller number of people who spend considerably longer than average using the artworks, forming a late small 'hump' in the highest time intervals. Audio Zone in particular shows a curve with 2 peaks, a mean which is not in the same region as the mode, and none of the sample in the first time interval. It may be that needing to book out headsets tend to 'committ' people to spending a reasonable amount of time with the work.

Mirror Images was the only piece where the prediction of how long is needed to get a 'reasonable experience' of the artwork (3 minutes) was longer than the average duration of use (see 'a' above).

The figures of around a quarter of viewers who 'came back for more' suggest that an uninterrupted period of viewing can't be taken for granted by artists. I suspect that in a group exhibition, people do an amount of 'division of time' between all the pieces, and then return to ones which interest them if they have time left over.

Interaction with other people:

Only one of all the observed people interacted with a stranger (anyone who he/she did not arrive at the exhibition with). However, there was a good deal of interaction (whilst using the artworks) between people who knew each other.

Of those users who came with others, the percentage of the sample who interacted with other people whilst using the artwork was highest for *Mirror Images (83%)*, then *Sonata (63%)*, then *Silver to Silicon (69%)*, and lowest for *Audio Zone (40%)* (see Figure 58, p.192).

This is a surprisingly high percentage considering that all of the pieces were more or less designed for one person at a time. Even *Audio Zone*, where each viewer has a set of enveloping headphones on, had a high percentage of people who went round the circuit together, gesturing and mouthing communication with each other. With *Sonata*, groups of as many as four people squashed into a very uncomfortable individual space.

C) FACTORS RELATED TO DURATION OF USE

For graphs of these factors, see Figure 49 - Figure 56, p.166 *ff*

Questionnaire responses:

Demographic:

Gender: Gender showed only a slight affect on use times: however, the only artwork by a woman artist (*Audio Zone*) was the only artwork used for longer by women than men.

Age: No general trend was identified by age groups. However, *Audio Zone* showed a constant increase in use-time as the age group got older. Conversely, *Mirror Images* showed a constant *decrease* in use-time as the age group got older.

Frequency of gallery visiting: No general trend was identified for this response, but *Mirror Images* showed a constant increase in use-time as frequency of gallery visits got lower.

Frequency of computer use: No general trend was identified for this response, but *Mirror Images* showed a constant increase in use-time as frequency of computer use got higher.

Judgements on quality of artwork:

In the relationship of qualitative judgements to time spent using the artwork:

Ease of use: No general trend was identified for this response.

Level of control: The users of *Mirror Images* who judged that they had a higher level of control over the work used the artwork for longer than average. In the other artworks this is vice versa; those who felt that they had less control tended to longer on the artwork.

'Sliding scale' qualitative judgements: The relationship of this set of qualitative judgements to use-time is mostly inconclusive. There is not even a

correlation between the judgements biased towards the positive and longer use times, as might have been expected.

The only pattern which appears to apply to the three artworks where this information was collected, is that those who thought the artwork more 'satisfying' than 'frustrating' were likely to use the artwork for longer average times.

The 'intimidating' question: For all of the artworks, those who responded 'yes' used the artwork for a shorter time than those who said they were not intimidated.

Observation:

The duration of use:

The only artwork where the duration of use was surprising in relation to the intention of the piece was *Mirror Images*, where the average time of 1 min. 52 sec. may not have been long enough to appreciate that the images of previous users appeared on the video screen, a major factor of the artwork.

To an extent, the physical logistics of the pieces obviously may relate to duration of use, for example the two pieces with chairs indicate that a long duration is expected, and that once committed to sitting down, viewers settle in for a while. With *Audio Zone*, viewers had to check out special headphones from the reception desk, which also has the characteristic of 'committing for a while'. With *Mirror Images* though, people could simply walk into the interacting area, and just as easily walk out again. I suspect however, that the long time lag before other peoples' images appeared, meant that many people just didn't realise that there was this 'second level', and exhausted the interest of looking at an image of themselves before the two minutes were up.

Interaction with other people:

See Figure 20 (next page), and Figure 60, p.194.

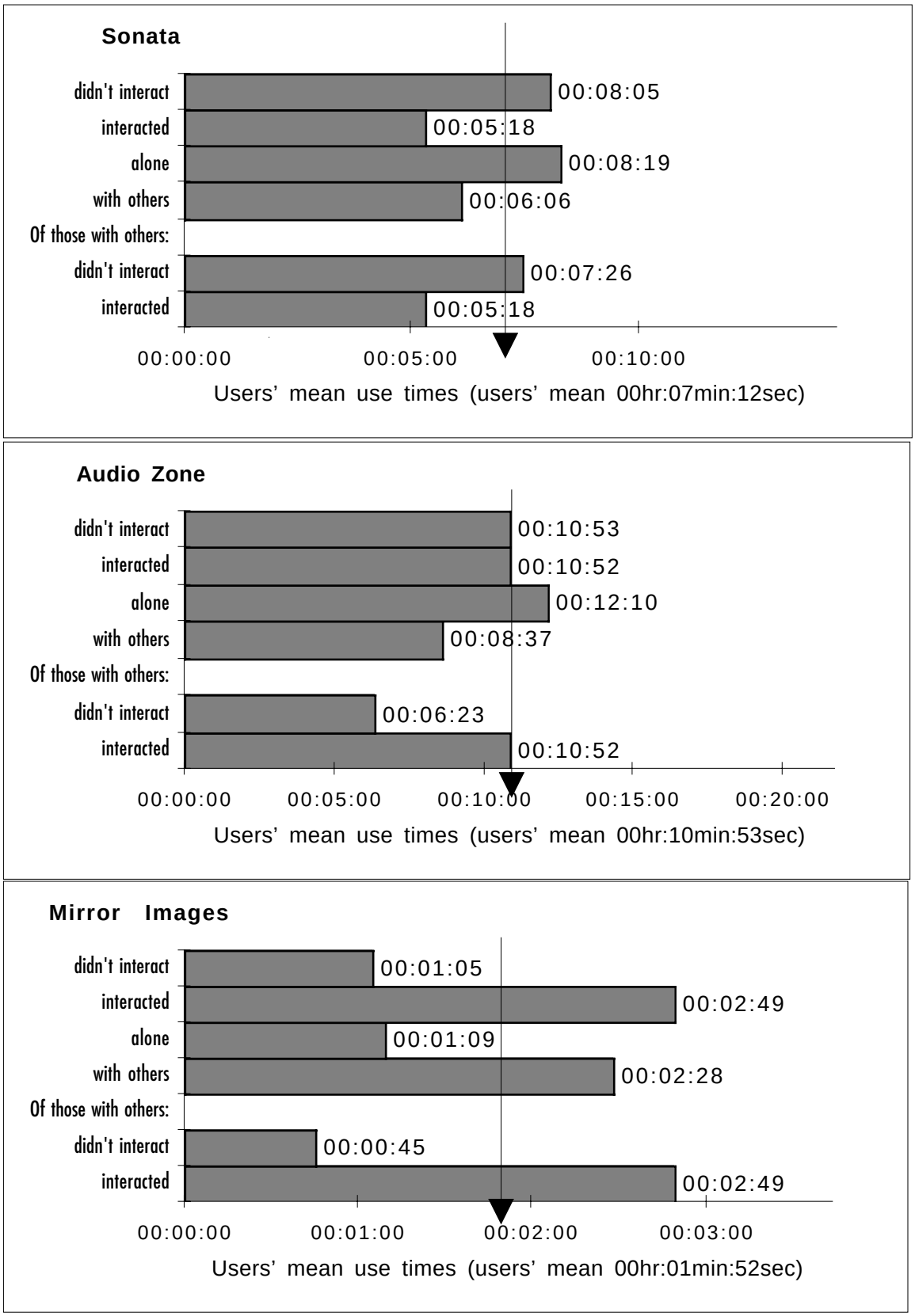


Figure 20: *V-Topia* artworks; social interaction in relationship to average use times.

Mirror Images was used for longer by those who came to the exhibition with others, than by those who came alone. This is the opposite of the results for the other artworks.

It may be that those who come to exhibitions with other people are more likely to feel 'drawn away' by the demands of others in the group, (especially if children are in the group). Of those who came with others: *Silver to Silicon, Audio Zone* and *Mirror Images* were used for longer average times if the users interacted with each other, than if they didn't, but in the same case *Sonata* was used for shorter average durations.

This factor of being 'drawn away' to something else could perhaps be lessened if people in the group are able to participate in the same exhibit at the same time. This was feasible with *Silver to Silicon, Audio Zone* and *Mirror Images,* but with *Sonata* the user space was very specifically designed for one person, and any others had to squeeze in, and hunch/crouch to see the screen (the fact that 69% of those who came with others interacted with each other whilst using it is perhaps an indication of the strong desire for a collective experience.)

Use whilst others are waiting:

It might be expected that people would use the artwork for shorter durations if they were aware of people watching/waiting. However, whilst this was true for *Silver to Silicon*, this was not the case for *Mirror Images* and *Sonata* where those who used the artwork whilst others were waiting actually showed longer average use times (see Figure 59, p.193). For *Audio Zone* this category was not very relevant, as once people had picked up their headphones from the reception desk, they would not really be aware of whether anyone was waiting for headphones or not.

6.3 The comparison of artists' predictions with the results

After the results had been collated, and taking into account that the great differences in intent of the artworks made comparisons between them of limited usefulness, it was thought useful to make a comparison between artists' intent and the result gathered. The three artists studied in *V-Topia* were written to (a copy of the letter shell and form are in Appendix IIIc).

Richard Land did not reply to several communications, and Grahame Weinbren replied explaining cogently why such information was not really relevant to him as an artist:

> ... Thank you for your letter, and the survey. I'm sorry but I'm not able to fill it out: the questions that you ask are simply not what is in my mind when I make work, and I don't know how to address them. I feel that, in a way, I am the last person who might be able to answer. Though interactive work is unlike other work in that the artist is somewhat in the position of the spectator (I can see my interactive piece for the first time, for example, in contrast to e.g. film: I can never see my *film* for the first time), it goes too far/would seem very obtrusive if the artist were predicting the behaviour of the viewers. If the intention of a work is to produce ideas in a viewer's mind, I'm pretty sure it could not result in much. ... (personal email, May 1995).

This opinion is an understandable and valid one for an artist, not to mention perhaps a field for other useful cultural research, but unfortunately not too useful for this research. Susan Collins, the author of *Audio Zone*, did reply, and her response is reproduced below, with my Questionnaire in bold type, her responses in normal type, with additional notes on the actual findings in capitals.

> **<u>Please make a prediction for your artwork of:</u>**
>
> **>How long do you think the average use-time would be?**
> 7 minutes
> [ACTUAL: 10 MINUTES 53 SECONDS]
>
> **>What percentage of the users would use it for less than 30 seconds?**
> under 5%
> [ACTUAL: 0%, THE SHORTEST TIME WAS 5 MINUTES 5 SECONDS]
>
> **>What percentage of the users didn't use the artwork in one block, but went >away from the piece for a time and then returned to use it?**
> 70%
> [ACTUAL: 27%]
>
> **>What percentage of the users *who came to the exhibition with other people* >interacted with other people (defined as exchanging words, facial or hand gestures with any other person) whilst using your artwork?**
> I would guess 100%
> [ACTUAL: 40%]
>
> **>What percentage of the users would respond that they felt intimidated or >embarrassed by having their actions whilst using the artwork visible to >other people?**
> This is a difficult question, as there is serious embarrassment, and a lighter, more entertained (and entertaining) kind of embarrassment — if you see what I mean.

> If you mean all kinds of embarrassment, I imagine the figure would be pretty high, maybe 80 - 90% (or more?!?). However, I would guess that figures for users feeling seriously intimidated or embarrassed (how does one measure these things?) would be much lower, perhaps 30%? [ACTUAL: 18%. HOWEVER, FACTORS OF 'INTIMIDATION' ARE NOTORIOUSLY DIFFICULT TO GET A REALISTIC QUESTIONNAIRE RESPONSE TO]

It would seem that for the important questions such as overall use times, this artist at least has a reasonable 'rule of thumb' awareness of probable patterns of use. However, she overestimates the amount of interaction going on between people. This information can perhaps be usefully applied to the further research of developing and testing an artwork informed by these case studies.

6.4 Conclusions from case studies thus far

To summarise the conclusions of the previous sections, it is perhaps most useful to return to the three Case Study Queries of 5.3:

CSQ1 Do visitors to art galleries choose to interact with interactive exhibits?

All three *V-Topia* artworks studied showed a surprising 100% usage by those who approached within 3 metres. *Silver to Silicon* showed a 81% record for the same factor although of course in different conditions. It would seem that despite mixed reactions to the quality of the artworks, most people are willing to get as far as 'having a go'. Around a quarter of users did not use the artwork in one go, but left the work and then came back to use it again. It would seem that artists cannot depend on uninterrupted use.

CSQ2 Approximately how long do gallery visitors actually spend interacting with interactive artworks?

Only 2% (2 of 98) of all users spent less than 30 seconds using it. Mean use times were:
18 min. 18 sec. for *Silver to Silicon*
10 min. 53 sec. for *Audio Zone*
7 min. 12 sec. for *Sonata*
1 min 52 sec for *Mirror Images*

These figures are much longer than the attention usually paid to exhibits in museums (Beer (1987) in a study of several museums reports that only 36% of museum displays were attended to for more than 30 seconds), and there seemed to be surprisingly little 'dabbling syndrome' where works were only used for a few seconds. However, these comparisons are not necessarily fair; the conditions between rooms of paintings/exhibits and interactive artworks are of course very different — for a start there are often very many exhibits in a room, whereas the maximum artworks per room in these case studies was ten. Neither is time alone of course an indication of the success of an artwork, but nevertheless an indication is given of the willingness of an audience to spend time with interactive artworks, for whatever reasons.

With the exception of *Mirror Images*, these results showed longer times than the minimum times considered needed for a 'reasonable experience' of the work, and were in proportion to these times. To an extent people seemed to spend about as much time on the works as the artists expected them to, and seemed roughly in proportion to the 'amount that was there to explore'. *Mirror Images* was the exception to this (people left before the two minutes at which images of previous people started to appear — an important aspect of the work) and could have been for a combination of reasons: It was physically easy to 'walk away from', and more people responded positively to the 'intimidation/embarrassment' question.

Some patterns of use were unsurprising, for example that many people will choose to watch others using artworks before using them themselves, and that people are willing to wait for an exhibit to become free for a time.

As a broad generalisation, users are perhaps rather more patient than might have been predicted, and seem willing to give substantial amounts of time and concentration to artworks.

CSQ3 What kinds of things might influence the duration of use? Particular areas of interest including:

- **gender.**
  Gender did not appear to have a large affect on use times, although *Audio Zone* (by Susan Collins) was the only artwork used for longer by women than by men. There was, however, some interesting differences

in which gender felt intimidated by which artworks (see Figure 47, p.181, and 'possible intimidation factors' below).

- **the affect of other people 'waiting'**
  Surprisingly, there was no consistent link between the presence of other people watching/waiting and use times.

- **possible intimidation factors**
  In all cases those who responded 'yes' to the intimidation question used the artwork for shorter than average times. It is not clear, however, whether people might be intimated by technology, by having their person looked at, or by the fact of being in an art gallery. The responses showed some interesting gender differences: all of those with a 'yes' response using *Audio Zone* were men but for *Mirror Images* all were women. *Mirror Images* was the work studied where the user's body was most visible, whereas the content of *Audio Zone* (large body parts!) perhaps intimidated men?

  It could be suggested that these findings may apply to a categorisation of interactive artworks, so that if selecting works for exhibition, an awareness of possible gender differences in relation to the content of work, and the level of 'exposure' of the person's body, may affect audience enjoyment.

- **the difference between individual and group use**
  This was perhaps one of the most surprising and interesting areas, with the second case studies confirming the patterns suggested by the first case study — namely that those who came to the galleries with other people very often choose to use interactive artworks together, even if they are designed for individual use, and even if other spaces are free.

  This factor led to more detailed research on previous studies of interactive exhibits, to see if this particular phenomenon was reinforced by the experience of others.

  McManus' (1987a) article 'It's the Company you Keep ... the Social Determination of Learning-Related Behaviour in a Science Museum',

fully acknowledges the importance of 'other people' when considering behaviour in museums:

> Clearly, people value the social interaction involved in visiting the museum. ... the majority of museum visitors will not be inclined to reduce their attention to, and responses to, the social climate they have brought with them when they give their attention to the exhibition ... (p.263).

She also identifies differing patterns of use between different groups in her study; Groups including children for example tend to use interactive exhibits for the longest periods of time, whilst single males use them for the shortest periods. Pairs of men are the most likely not to interact with an exhibit at all, and single males second most likely. Male-female pairs are the least likely (after singletons) to talk to each other whilst interacting with exhibits.

Zelevansky (1995), has informal observations of a museum educational multimedia piece:

> ... more often than not, a single child sitting down before the monitor attracts others, who stand behind, watching and making comments. While only one child may control the mechanism, the exchange seems to involve the group. This may have something to do with the passive entertainment values of the exhibit or a sense of relief on behalf of the group that someone else has been willing to take charge.
> ... The sometimes raucous kibitzing of children standing around the Color & Light exhibit was a way for them to remain engaged — to belong — without having to commit to taking control of the machine. (p.142).

Mitchell and Bicknell (1994), drew the following conclusions from a formal study at the *Launch Pad*:

> There is a positive correlation between:
> attracting power and talking to companions at exhibits;
> interacting with others and how much visitors say they enjoyed an exhibit. ... (p.2).
> Nearly two-thirds of visitors talked to somebody during their time at an exhibit. (p.13).

Stevenson (1993) does not explore this particular factor in depth, although he does remark that;

> On average, children spent 24% of their time spent interacting, away from their group with other visitors, whereas adults interact less than a quarter as much in this way. (p.97).
> ... children are more likely to interact with strangers at an exhibit than adults. (p.205).

However, if his figures are re-examined in this context, some interesting results can be seen: Of the 68 exhibits in the *Launch Pad*, subjective judgements were made from his descriptions, about which exhibits needed more than one person to make them work fully: (*Beamed Voices, Energy Store, Giant Steelyard,* and *Two-way Mirror*). If the 'overall popularity' scores for these pieces are looked at, *Beamed Voices* is in the top score (of all 68) of 85%, *Energy Store* in the third place at 75%, and *Two-Way Mirror* is in 7th Place at 67% (*Giant Steelyard* is less popular in 17th place at 40%) (*pp.*226 and 110). This suggests that these exhibits, where interacting with others is important, were rather more popular than others.

Overall, despite the differences in aims between art exhibits and educational exhibits, some interesting patterns in relation to interaction between people may perhaps cross both fields.

Chapter 7 How the research thus far relates to the making of an interactive artwork and the curating of *Serious Games*

The research described thus far could be described as a progressive definition of terms, a whittling down to more specific areas of interest, and a progressive diachronic series of formal case studies to compare patterns of observed behaviour with previous more informal observations.

The key area of interest refined from this research was this:

- People often use interactive artworks with other people, even when inconvenient to do so.
- Some interactive artworks show increased use times linked to the occurrence of interaction between people during use of the artwork. This is also suggested by some studies of museum interactives (see 6.4).

From the point of view of an artist and curator, a question which arose from this (henceforth called 'The Key Question'), for possible further research was:

> **If interactive computer-based artworks are made with a stated aim of encouraging interaction between people (at the same time and in the same space), do they do so, and in what ways?**

The next sections of the research build on the previous chapters, and further explore this key question, which is applied to (and developed within) two different practical knowledge bases:

- The curating of the exhibition of interactive artworks, *Serious Games*.
- The making of an interactive computer-based artwork, *Individual Fancies*.

Both practical bases were of course also informed by a wider range of existing previous knowledge, and affected by the demands of art production and arts administration respectively. Nevertheless, it is useful to analyse each in reference to this research in particular.

Figure 1 (p.17) shows a diagrammatic approximation of the relationship between the strands of research, both practical and theoretical.

7.1 The exhibition of interactive artworks *Serious Games*

> Our machines are disturbingly lively, and we ourselves frighteningly inert. (Haraway, 1990, p.152).

The research and development for *Serious Games* started in 1990, before the commencement of the M.Phil./Ph.D. research, and hence was based on a wider range of research, as well as being affected by a much wider range of pragmatic variables such as budgets, gallery construction, etc. The analysis of *Serious Games* for the purposes of this research will not therefore be a full description of the process and philosophy of the exhibition (which could occupy a whole dissertation), but a very select critical commentary on aspects which relate most usefully to the research thus far.

7.1.1 Brief description of the exhibition and process

Further information concerning the artists and exhibition can be found in Appendix IV, the catalogue of the show. *Serious Games* was an exhibition of eight interactive artworks, developed as a joint project for the Laing Art Gallery and (from 1994) the Barbican Art Gallery, and shown at those two venues. As a freelance curator, the author was responsible for the research and selection of the artworks, subject to final approval by the two galleries. (Carol Brown of the Barbican Art Gallery also made a research trip to New York, Montreal and San Francisco and suggested several artworks, of which *Hallucination* was primarily her suggestion.) The research for the exhibition started in 1990 whilst the author was employed by Projects UK (a media arts organisation) and carried on through freelance work during residency in San Francisco and visits to Banff, Barcelona, Montreal etc. Information was obtained on over 250 artists, and visual material gathered from 73. The processes of selection were rendered more complex by the difficulty of confirming whether sufficient budgets/equipment would be available to show each work, and in practice works were confirmed over a period of time, roughly:

Nov. 1995 *NetEscape, Zeromorphosis*
Jan. 1996 *Indigestion, Rehearsal of Memory, Passage Sets,*
Jun. 1996 *Resonance of 4*
Jul. 1996 *Osmose, Hallucination*

For the purposes of this dissertation, only the Laing showing is referred to, as the Barbican showing did not occur until after the completion of the research period.

7.1.2 How the exhibition relates to the other research

The curation of the exhibition differs from the other aspects of this research in that it is in the main concerned with the successful selection of a *group* of interactive artworks, whereas much of the other research concerns studying individual interactive artworks (although sometimes in a group exhibition context). Questions of balance and variety are therefore much more important, and this is reflected in the kinds of analysis used, concentrating mainly on the factors affecting selection of the artworks.

For the purposes of academic research it would be most elegant for the selection of artworks for *Serious Games* to have followed a logical plan informed by the formal research so far. For the purposes of practical exhibition curating, this of course did not occur, as artworks are selected for a range of political, practical and illogical reasons, including the fact that the curator simply happened to like an artwork very much.

However, the exhibition research did start with a list of basic curatorial desires, some of which relate to this dissertation. The findings of Case Studies 1 and 2 did affect the selection of some of the artworks, as will be described. The basic core requirements were that the exhibition should comprise of artworks which:

a) Included no-tech interactive artworks as well as computer-based interactive artworks.
b) Had strong serious content, rather than abstract aesthetic interest.
c) Should include artworks of different interactional 'characters' to appeal to varied characters and types of audiences (e.g. extrovert, shy)
d) Should work effectively in conventional gallery settings, with a general interest (not expert) audience, and varying numbers of participants.

Beyond these requirements, the key factors affecting selection were the feasibilities of having the budget available to provide the equipment, and the

artworks being able to physically fit into the spaces available (The Barbican Art Gallery has a low (10 ft.) ceiling height which ruled out some artworks.)

It is requirements c and d which most strongly relate to this dissertation:

REQUIREMENT C

(concerning 'different interactional characters').

Whilst before the formal Case Studies there was a rough consciousness that different means of interaction might appeal to different sorts of people (see Appendix II), the case studies brought out in particular the different gender responses (in relation to issues of 'intimidation') to the *Mirror Images* work where the viewer's own image appeared on screen. Because of this, although there were several available artworks of this kind (where the viewer's image moving around on screen triggers various responses), and although these works tend to be popular with children, it was decided to include only one of these kind of works (*Hallucination*), because of their possible intimidatory affect on women.

Because of the varying lengths of average use times discovered (which seemed to roughly equate to the artist's intentions), it also seemed reasonable to include a range of paces in the artworks, from more immediate responses such as *Hallucination*, to slower contemplative pieces such as *NetEscape* and *Passage Sets*.

REQUIREMENT D

(concerning 'varying numbers of participants')

This is perhaps most relevant to this dissertation. An exhibition in a gallery simply will not work if each exhibit is exclusively for one person, plus queues of others. From early hunches about this, the Case Studies solidified and amplified the intention to include several pieces which were rewarding when used by more than one person. The intent, however, was not for the show to consist exclusively of these works; the seriousness of sustained one-to-one interest in artwork was not to be devalued or dismissed.

In all of the artworks, there was space left so that if people wanted to share use of the mouse etc. they could do that (this decision was a direct result of the observational case studies). Numbers of possible users at one time were borne in mind when selecting artworks for the exhibition, in the interests of traffic flow. It may be useful here to categorise the eight artworks selected by the numbers of people able to participate rewardingly, in five categories, the final category concerning the level of reward in particular:

- Solo use, others simply have room to spectate
- Mostly solo use, but spectating is also rewarding
- Good for 2-5 people to use at the same time
- Good for 6+ people to use at the same time (and enhanced by many people's use over time).
- Enhanced by co-operation between several people at the same time

Solo use	**Mostly solo use**	**Good for 2-5 people**	**Good for 6+ people**	**Enhanced by co-operation**
Rehearsal...	*Passage Sets*	*Indigestion*	*NetEscape*	*Resonance of 4*
	Osmose	*Hallucination*	*Zeromorphosis*	

Table 1: Categorisation of *Serious Games* artworks by numbers of participants.

Within the range of available computer-based interactive artworks, there are many more designed for solo use than for multiple use, which created a challenge for the exhibition. *NetEscape* and *Zeromorphosis* are among the more 'low-tech' artworks, with room-sized installations of physical objects enabling more people to participate. They are also enhanced by more people participating over a period of time, so that people can respond to previous people's messages etc. In researching artworks where co-operation between audience members at one time in one place actively enhances the experience of the artwork, only three artworks were uncovered by extensive research: Perry Hoberman's *Bar Code Hotel*, Joel Slayton's *PulIt*, and Toshio Iwai's *Resonance of 4* (see Appendix I). As the equipment needed to run *Bar Code Motel* was unavailable within the budget, *Resonance of 4* was chosen for the

exhibition. The determination to include a work in this category, despite the rarity of such works, was a direct result of the case study research, and the artwork became the focus of further formal study (see Chapter 8). Categorising the artworks in terms of quantities of users, however, is not necessarily parallel to other means of taxonomy. It may be useful at this point to compare the selected works against the taxonomy developed in section 4.2.

7.1.3 How the selected artworks fit into the 'conversation' taxonomy

The taxonomy of section 4.2 was applied to the *Serious Games* artworks (see Figure 21). Although there was not a formal process of grading artworks by this taxonomy when considering selection, there was a more general awareness of

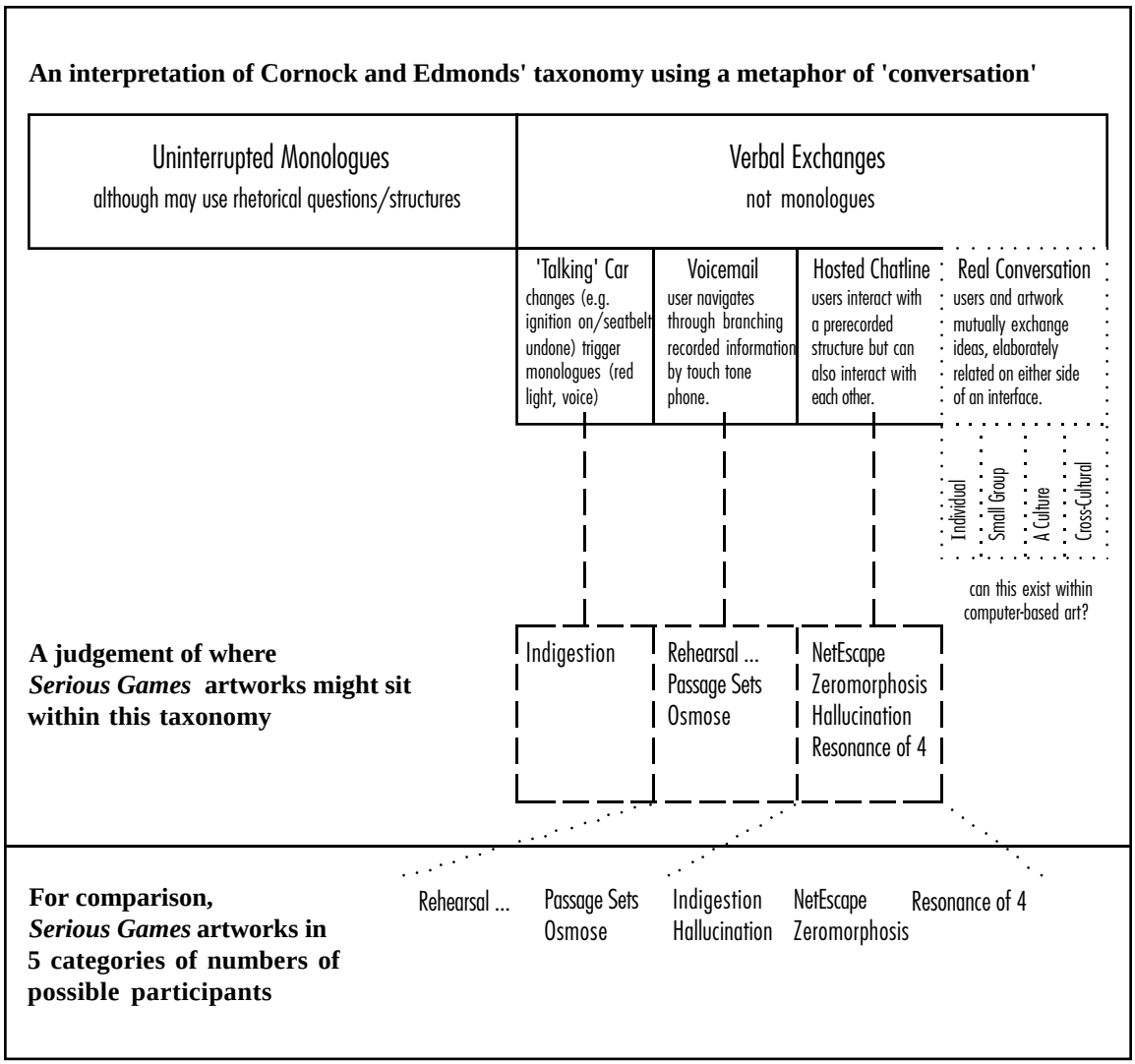


Figure 21: A judgement of where *Serious Games* artworks may sit within the conversational taxonomy of 4.2.

wanting 'more interactive' artworks to be included, and that as computer-programmed 'real conversation' was unlikely to be realised, then the 'next best category' would be artworks in the 'hosted chatline category'. It was not until after selection that a formal analysis of artworks using this taxonomy was done.

It appears that the selection was reasonably successful in choosing artworks from the 'more interactive' end of the spectrum, and that as suggested in 4.2, none of the computer-based elements achieved 'real conversation', but rather enabled the audiences to interact with each other. *NetEscape* would perhaps have the largest claim to this, but the real conversation was in fact happening between the real artist and the audience, rather than between the computer-based artwork and the audience (the computer-based elements acting as a 'host' rather than a conversationalist).

If an additional comparison is made against Table 1 (p.98), where artworks are arranged in order of numbers of possible participants (and the quality of experience), then it can be seen in this case that there is a broad association between the patterns (with the exception of *Indigestion*). Whilst of course this would not apply on every occasion, it would appear that with the *Serious Games* artworks, those artworks which are rewarding for more people at a time are also those which are 'more interactive' on the scale. This is unsurprising in that if the artwork is acting as a 'host' then with more people, more interaction might be possible between the people. In this case, the pragmatic gallery consideration of wanting increased traffic flow might also have the side effect of encouraging choice of the 'more interactive' artworks.

Formal studies were not carried out on the exhibition in general, (only on *Resonance of 4*, see Chapter 8) but an overview was obtained by anecdotal evidence, gallery comments books, press reviews and informal observation. Some general comments relevant to this dissertation are that:

- The audience tended to be younger than for other historical Laing exhibitions.
- Generally, traffic flow was satisfactory (i.e. not too many people queuing, or with not enough space to move through rooms) at all but the very busiest of times (i.e. the launch evening).

- The artworks mentioned in a positive way most often in the comments book were *Zeromorphosis* (13), and *Resonance of 4* (12) (both artworks in a 'more interactive' category).
- However, every artwork was mentioned positively at least once, so the combination of artworks seemed to offer something to a wide range of visitors.
- The negative comments in the comments book tended to centre on the problems of very diverse expectations of the show: Some were disappointed that the show was not of paintings, some were disappointed that the show was not like the immediate gratification of commercial computer games, and many were disappointed that some of the exhibits were not suitable for children. This latter was mainly a problem of the marketing of the exhibition (which despite objections, freelance curators have little control over) which stressed the 'fun for kids' aspect of the show, thus misrepresenting the show as a whole. Also, probably because of television advertisement hype, many people have mistaken expectations of what is technologically possible (e.g. they expect full screen video live on the Internet, and Virtual Reality experiences which are indistinguishable from real life!) This is bound to disappoint.
- The position of the 'virtual reality' piece *Osmose* within the show was an interesting and problematic one. As a very high technology work, it attracted a lot of press attention, which tended to overwhelm other aspects of the exhibition and stress the 'high-tech' idea, so that many people thought the whole exhibition was a 'virtual reality' show. The need to book in order to wear the helmet was also an unavoidable unfamiliarity for gallery visitors, and sometimes a disappointment. Despite the projection, headphones and silhouette designed to enable the experience to be shared, VR type experiences will probably remain difficult to manage in gallery context.
- Although the exhibition was laid out in a linear fashion, many visitors went back and forward several times, revisiting works.
- Although there were fairly explicit instructions for each work, many people were still afraid to touch, and had very basic inexperience, such as never having used a mouse. The attendants and helpers in the gallery were very important for reassurance and help, especially in the early stages of the show.

A survey of visitors to the Laing Art Gallery was carried out by Wood Holmes Marketing, during the last two weeks of the *Serious Games* exhibition (Ruddick, 1997). Whilst much of their report is not terribly relevant to this research, some data is perhaps interesting. They interviewed 220 people, as they left the building, and 34% of them had seen the *Serious Games* exhibition (as opposed to other parts of the Laing Art Gallery:)

- The proportions of women to men who saw *Serious Games* was exactly the same as the proportion of women (55%) in the Laing's general audience (as evidenced in studies over a series of three different exhibitions in 1996) (p.9). As it was hoped that *Serious Games* would not just appeal to traditionally technophile men, this is encouraging.

- The proportions of those in the under-20 age bracket was higher for *Serious Games* than the Laing's general audience (23% as opposed to 13%). As this age group is wide, it is not, however, possible to tell whether this might have children (attracted by the 'game' title), or older teenagers with a techno-cultural interest.

- Of those who had seen *Serious Games*, 65% said they had enjoyed it either 'a lot' or 'very much indeed'. This can be compared to previous studies at the Laing- the result was 61% for 'Tate on the Tyne' a contemporary fine art exhibition, 82% for "Treasures of the Lost Kingdom' (an exhibition of artefacts, and the Lindisfarne Gospels, from mediaeval Northumberland) and 84% for Palace of Victorian Art (Grosvenor Gallery paintings). For *Serious Games*, those who had *not* been to the gallery before, and women, were more likely to say that they enjoyed it. Perhaps *Serious Games* was more enjoyable than contemporary art but not as enjoyable as history for the Laing's regular audience?

Overall, it is *not* usually possible for curators to objectively assess the 'success' or otherwise of an exhibition, but considering all the difficulties involved, the exhibition seemed fairly successful in meeting the initial curatorial aims. From a curators' point of view, the exhibition's success was positively aided by the findings of the case studies, and the related decision to include more 'co-operative' artworks and those which were better for more people to use at a time.

7.2 The interactive computer-based artwork *Individual Fancies*

> ... the phrase 'reach out and touch someone', with its shrill note of aggressive intimacy... The current call for interactivity on the part of video artists is part of a larger societal development of machine-augmented simulacra of intimacy. (Wooster, 1991, p.275).

The making of an interactive artwork not only responded to the theoretical research, but formed part of the research process itself — a development of ideas from the general to the specific, progressing ideas by visual means.

A diagram/time-line of the relationship of the making of the artwork to the other research stands can be seen on page 17 (Figure 1), and a more detailed description of the process found in Appendix V. This section more particularly analyses the ways in which the making of the artwork relates to key strands of research as a whole.

7.2.1 Brief description of the artwork and process

Individual Fancies, the artwork eventually developed, is an interactive computer-based artwork, presented to the public as four chairs and a table, upon which is a cloth, a teapot and four cups, and a data projection onto the table-top of images and sounds which react to use of the teapot and chairs (see Figure 22).

What happens:

The table stands in a warm pool of light, an embroidered pattern (echoing the dot pattern of LCD video projection) projected onto the linen cloth. If nobody sits down, a soft voice invites people to take a seat. If a viewer sits down, then in their place at the table a pair of projected arms appear in slow animation (each seat has a different 'character' which is constant). If only one viewer sits at the table then the fingers drum, the voice sighs, and quiet comments suggest obliquely that someone else should sit down too.

Only if one or more other viewer(s) sits down can the next 'level' be reached, and the 'conversation' started. The teapot becomes active (again, hints are given if no-one uses the teapot). By rotating the teapot and 'pouring' the viewers can fill each others' cups by video projection, and then that projected

character starts to reveal things about their story, in a poetic monologue pattern of about 15 seconds, common to all the 4 characters. They also show objects (snaps, leaflets, toys) and their hands move with the words, revealing their story by a series of clues.

Figure 22: Two people using *Individual Fancies*.

{VIDEO CLIP ON CD} 4: *INDIVIDUAL FANCIES*; TWO PEOPLE USING.

The next 'level' is triggered by further tea pouring by viewers and starts to reveal how the characters overcame their isolation. 'Rewards' of plates of fancy cakes ('individual fancies') appear projected on the table, and the table becomes littered by objects and many voices, the pacing becoming much more upbeat.

If all the characters present complete their revelations, then additional visual rewards are triggered, like the figures on the embroidered tablecloth becoming animated, and meeting up together, or the cakes metamorphosing. The characters then invite the actual audience to speak to each other, or tell a story.

The audience can leave or take seats at any time, and the hands leave and progress through their roles at appropriate points.

The Characters:

The four characters who appear at the table represent a range of 'isolations and community' and a range of speech patterns and textures from Scottish to South Asian: including a divorced father, a trade unionist for homeworkers, a victim of crime, an isolated computer worker.

The characters are based on interviews and conversations over years of living in post-industrial areas where crime and unemployment is a problem, and special past research into homeworkers.

Full scripts are in Appendix V, but some examples of the revelations from the characters are:

> *First monologue:*
> "It's like trying to squash a week's relationship into a weekend. It's like I'm trying to make up for divorce by forcing ice cream down them. It's like trying to shoehorn a whole family into my poky wee bedsit." (Scottish father)
> *Third monologue:*
> "Now we crack on so much the kids call us wifies, but they swap stories too, maybe about their part-time dads. Now, they make me do things, those kids, we did pottery with them the other day... looks like it would fall apart doesn't it? But it didn't." (Scottish father)

The Process of Making the Artwork

The details of the process are described in much more detail in Appendix V.

Once the rough idea of the tea table was settled upon, the process was a relatively straightforward one of elaborating upon the basic idea, experimenting with the technical possibilities with help from others, and refining the content with reference to both the responses of others, and the findings of other research. Using multimedia authoring software means that prototypes of the programmed elements (which pictures and sounds appear when and how) can be reworked, cannibalised, changed and improved very flexibly as the work progresses. The other elements, such as the physical table etc. the voice recordings and the hand images, were less easy to rework once

made, and so were not completed until later in the development. Therefore for those elements, there was more pre-planning on paper, with sketches (see Figure 66 *ff*), and scripts for the characters which were improvised, and re-written many times before being recorded with actors.

Rough installation tests of the work were mounted at certain points, and shown to supervisors and others. A diary of notes was kept of all aspects of the development of the artwork (see Appendix V), from the sketching of ideas, technical and administrative details to emerging ideas of 'what the process was like'. This last aspect was included for several reasons:

- Because the production structures for interactive computer-based art (unlike say film-making with its team roles, or bronze-casting with its sketch-maquette-clay-bronze linear time-line) are yet to be fixed by convention, and may go in several directions.
- Because art-practice-based research is also still relatively experimental, and open to useful new metaphors of analysis, such as Douglas' (1992) metaphor of musical improvisation as applied to sculpture production.

As outlined in Appendix Vb, the theatrical metaphor was explored extensively, but perhaps the most useful metaphor to emerge from this analysis was an unpredicted mirroring of the concerns of the case studies — that of the tension between the individual and the group, between solo or team work, between isolation or conviviality. That is, the production structures of this piece of computer-based interactive artwork had a hybrid relationship both to the group production structures of video/theatre and to the solo production structures of graphics/sculpture. It involved both isolated programming periods, and convivial periods where co-operation and persuasion with other people was needed. The 'hosted chatline' of the 'conversation metaphor taxonomy' suggested a name for this means of production of interactive artwork — that of 'artist as host', combining some solo preparation and planning, with socialising and live interaction. This metaphor of 'artist as host' will be used to analyse some aspects of the research.

7.2.2 How the artwork relates to the other research

The development of an artwork can never be a strictly logical process, and should not be seen as being 'made to prove a formula', but rather as a means of exploring certain questions. In this case the main question was very directly

produced by other strands of the research, and relates to 'The Key Question' of section 7:

> **If interactive computer-based artworks are made with a stated aim of encouraging interaction between people (at the same time and in the same space), do they do so, and in what ways?**

As well as relating to the 'Key Question', the artwork was naturally informed by other aspects, in particular:

- theoretical debates concerning technology and human contact
- other artists' interactive works, from *Serious Games* and other research.
- more general patterns of use of artworks from Case Studies.
- previous art production and life experience.
- previous research on taxonomies especially the metaphor of 'conversation' (see section 7.2.3).

Developing the idea for the work

As well as 'The Key Question' there were some other more general influences over the development of the parameters and ideas for the artwork. Some of these arose as characteristics to definitely *avoid* rather than aim for. For example, there was a strong point of disagreement with Bell's conclusion that:

> The most important implications of this research concern the need for the audience to be skilful enough to perform the interactive tasks necessary to participate in the works. The potential audience will have to develop the necessary participatory skills if participatory works that use computer technology are to develop into a new medium as many predict. (1991, p.215).

Therefore the accessibility of an artwork to technical (or gallery) neophytes became one of the desirable parameters for the artwork. Another general concern was the variety of tactics for artworks where co-operation of the audience was important — how much 'authorship' does the artist maintain, and how much is handed over to the audience? Whilst some see full handover as the ideal, others such as Andy Cameron (1995) argue the opposite:

> Every successful form of communication involves protagonists, a set of conflicts and experiences, and at the end some sort of resolution so the thing has a satisfying shape. Interaction largely destroys all that. By giving the audience control over the raw material you give them

> precisely what they don't want. They don't want a load of bricks, they want a finished construction, a built house.

After consideration of the general issues, some basic parameters for the artwork were drawn up:

The Major Parameters:

1) To make a computer-based artwork which would encourage interaction between people.
2) To make an artwork where the experience was enhanced by multiple simultaneous use, and/or co-operation between people.

These aims are not identical, but as seen in section 7.1.2, can be linked.

There were also some more minor parameters:

3) That it should try to exploit the pleasure of physical interaction without making people too self-conscious of others watching their bodies.
4) To try a different approach to the few existing artworks requiring co-operation for full enjoyment (see 7.1.1., p.98).
5) That it should be accessible to technical neophytes, but those with life experience might be privileged. It should be 'approachable'.
6) That it should be aimed at adults rather than children.

Parameters 1, 2, and 3 obviously spring directly from the previous case study research, concerning group use, interaction, and differing gender responses to artworks where 'the body' was more exposed. The other parameters were informed more generally by different strands of the research.

Parameter 4 relates to Cameron's quote concerning wanting a built house rather than a pile of bricks. I wanted to try an artwork where the viewer had at least a semi-complete house rather than a shell (however elegant) such as presented by Toshio Iwai. Perhaps an artwork where the personality of the artist was up front rather than hidden. I wanted to challenge the tendency which Patricia Search points out,

> ... with electronic communication, there is a tendency to focus on the content of the data and the synthesis of individual and collaborative perspectives, instead of highlighting the creators of the information. The

> result is a communication format that is characterised by cultural anonymity rather than cultural distinction. (1993, p.63).

The intention was to develop the artwork, exploring the questions en route, and in addition to make a case study of audience reaction to the work, matching intent against specific patterns of interaction, especially in relation to parameters 1 and 2.

The previous experience of art production was also obviously a major factor, and my experience was of mixed media production, involving photography and textiles, with some video experience.

In developing ideas for the artwork, three main ideas were explored, which all sprang from consideration of interaction with an interface which was adapted from everyday domestic objects, as parameter 5 suggested these rather than an interface of 'a computer' (the interface could trigger some kind of visual content in either case):
The three possibilities were based on interaction with:

- A step exercise machine. Based on issues of individual 'social climbing' as opposed to co-operative behaviour. This addressed the issues, but could not really be adapted to suit collective use or physical co-operation.
- Shoes. An idea that interacting by 'standing in other people's shoes' might encourage empathy with other people's positions, and hence co-operation. More suitable for multiple use, but with the possible problem that shoes were too 'intimate' (not to mention Freudian) and may inhibit interaction because of that.
- Tea table. A welcoming interface but not too intimate. Real tea tables are better with more people. People can sit down and may stay for longer bits of narrative. The content was not fixed at this point, but could deal with issues of co-operation. I like cakes.

The tea table option was chosen because I like cakes and because it most comfortably seemed to have the potential for fulfilling the parameters.

Once under production, the evolution of the artwork was informed not only by evolving discoveries from the case studies, but by the artist's work being researched for *Serious Games*. Approximately four months into production the work *Indigestion* by Diller + Scofidio was discovered, which has some structural

similarities (it is a dinner table with images projected down onto it) but also some important differences:

- The interface is a touch screen (as opposed to everyday objects).
- The content is completely different: concerning a film noir narrative, sexual innuendoes re: food, and issues of 'choice' (as opposed to food as sharing, everyday stories, and issues of isolation versus co-operation).
- Users get to choose which two characters meet at the table (in *Individual Fancies* the characters just depend on which seat is sat in).
- Users do not sit at the table, but watch a narrative which lasts in all about 7 minutes (much longer than *Individual Fancies)*.
- The aim of the work was not to encourage interaction between people or to be enhanced by multiple use.

The work did, however, influence the development of *Individual Fancies*. *Indigestion* has a particularly good script for the characters which adds greatly to the enjoyment of the work. It was determined to rework the scripts for *Individual Fancies* even further, with advice, and to make them more condensed.

The development of *Individual Fancies* also affected the selection of artworks for *Serious Games*. The progressive condensing of ideas into a short, effective format for *Individual Fancies* gave a much more critical view of how well the other artworks got across their point. Also the extensive exploration of the ways in which the artwork might relate to the audience in turn made it very obvious how much the artists had considered the audience themselves, and artworks which showed clear evidence of this (such as *Osmose* and *Indigestion*) were looked on more favourably.

7.2.3 How the artwork relates to the 'conversation' taxonomy

The metaphor of 'conversation' played a large part in developing the ideas for the artwork (and in analysing the structure of the process of production, see 7.2.1).

The artwork was aiming for the 'most interactive' possible category, the 'Hosted Chatline' (Cornock's 'Participative') where the computer can at best be a 'good host' — providing the stage and social lubricants, introducing

people to each other, providing stimulating ideas topics of conversation, and then leaving the real people to do the real conversing.

This was a stimulating starting point, but within this category, many different possible tactics for an artwork were discovered, room enough to reflect different 'host/artistic personalities'. Bell (1991, p.86) points out Krueger's comments that the way the environment treats its participants will reflect the attitudes of the artist, for example, 'While in some programs the environment may be willing to cajole the participant into a conversation, in others it might choose not to bother.'

Taking the three examples of 'artworks which require co-operation' (7.1.1.) for instance, *Resonance of 4* has the artist as a very cool and distanced host, who has designed an elegant game beforehand, and then leaves the guests to explore by themselves. He enables the guests to interact in a physically non-intimate way, using very structured abstract sounds and images. Creative input from the guests is very important for this piece, and the creative personality of the artist/host is minimised.

Bar Code Hotel has a host who is perhaps a little less distanced. He provides certain quirky objects (which although fairly mundane have a certain stamp of personality) and possible actions to guests, for them to play with. The guests can see and talk to each other rather more easily than in *Resonance of 4*, and so as well as interacting on the screen with images, can interact with gestures and words. People seem to imbue 'their' objects with their own character and narrative. Creative input from the guests could work alongside the characters provided by the artist

PullIt showed a mischievous character of host where the co-operation of the guests was planned to reveal the random and chaotic nature of their 'choice' offered by new technologies. Interaction between the guests might have been centred on the difficulties of how to use the work (which often promotes solidarity of the 'Dunkirk Spirit' kind, but may not have gone beyond that). There is little creative input possible, however, from the guests.

In developing the artwork, and especially in considering different tactics by which interaction between people might be encouraged, it became clear that it may be useful to further subdivide the category of 'Hosted Chatline', which

was the category being aimed at with *Individual Fancies* and was also the category where many of the artworks in *Serious Games* fell.

However, despite extensive explorations, there were no simple subdivisions discovered which could adequately express the *range* of factors which together contributed to concepts of 'levels of interactivity', and recognised the different kinds/levels of activity that might change through a duration of use.

Eventually, going back to Bell's research proved useful:

> ... the characteristics identified all contribute to the degree and manner of control that participants have in the work. ... The analogy with music led to the devising of a method of recording how the degree of control afforded to participants changes over time; plotting the changes in degree of control on a horizontal line like a musical score. (1991, p.204).

His idea of a musical-type 'score' for each artwork, and a list of characteristics, could perhaps be adapted into (much simplified) tools for these purposes. Simple graphs of the main variables, against time, could be made. Ideally, these might give some kind of expression to the 'kind of host' that the artist was being, *vis-à-vis* the 'level of control' of audience and artist. The variables were pared down to:

- 'Artist': The level of the artist's control (via the artwork) over the way in which the content of the artwork is seen.
- 'User': The level of creative interaction possible between users and artwork.
- 'Between users': The level of creative interaction possible between users and users.

Plus the varied media or means of interaction (i.e. images, speaking, body movements etc.) which can apply to any of these.

Some rough graphs were made (see Figure 23) for the four 'co-operation' artworks referred to above, and for comparison, two artworks in the 'less interactive' categories on the taxonomy of 7.1.2. The lines of the graph are very rough subjective 'rules of thumb' but help to give a form to the 'shape' of the artwork, in relation to interaction and people. Thus *Resonance of 4* shows an artist with high initial control over the shell of the work, but who quickly hands over creative input to the users, whose learning curve enables more creative input, and then enables even more if they co-operate. Figure 23 shows

interesting patterns emerging: the two artworks from the 'less interactive' category (*Rehearsal of Memory* and *Hallucination)* show a pattern similar to each other, but which is different from the four 'co-operative' artworks. Within these four, *Individual Fancies* does show a differing pattern, reflecting the difference in intent on the work, i.e. to retain more early authorial control

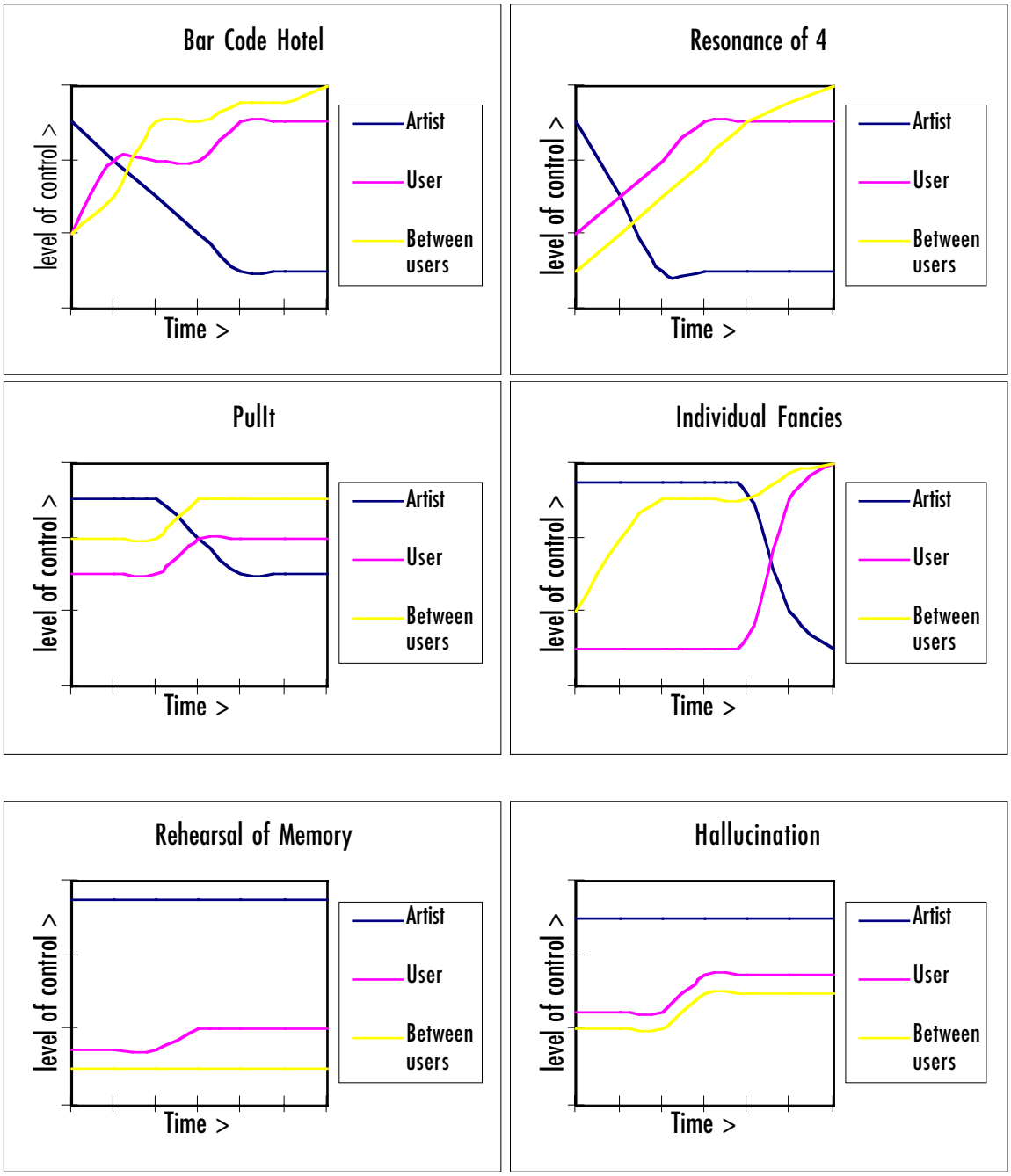


Figure 23: Rough graphic representations of three interactional factors applied to eight interactive artworks.

for the artist, whilst also encouraging interaction between people at a later point. From these rough patterns it may be possible to recognise certain 'shapes', for example, *Bar Code Hotel* and *Resonance of 4* have similar intent and the same 'sperm whale' shape, whereas *PulIt* has a thinner whale shape for a similar intent but of different scale. *Individual Fancies*' whale swims west instead of east. Whilst it is unlikely that curators would take to time to make graphs of all interactive artworks that they consider, this kind of categorisation may be useful at a more considered point; if for example, having selected ten works for an exhibition, they all turn out to have the same 'shape' then it could be time to consider varying the interactional 'character' of the artworks more. This 'character of host' needs especially to be considered in group shows.

If notes on the means/media of interaction being used are attached to these simple graphic representations (see Figure 24), then perhaps a basic representation of the overall 'character' of an interactive artwork is possible, which may also be useful for further comparing the different dynamics.

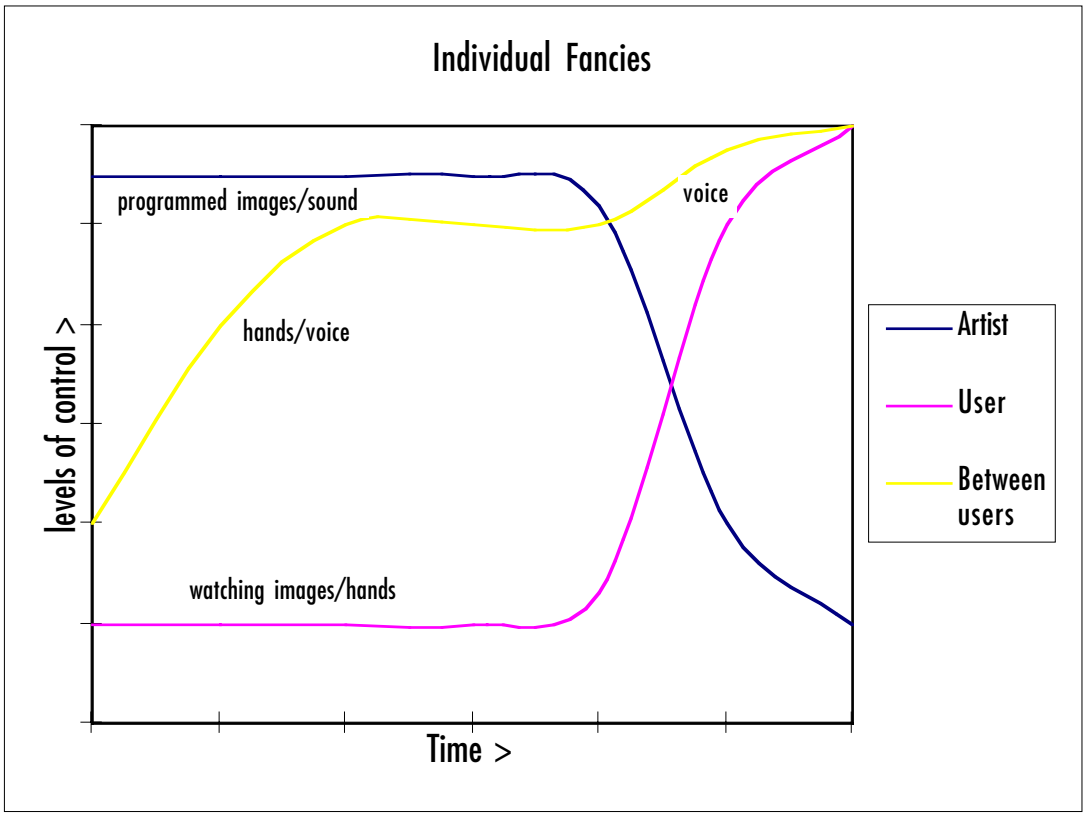


Figure 24: Graphic representation of *Individual Fancies* with additional media notes.

7.3 Summary

The 'conversation taxonomy' developed in section 4.2 can be usefully applied to both:

- Analysis of the selections for *Serious Games*, in parallel to analysis of the numbers of users different artworks can cater for.
- The differentiation of *Individual Fancies* from other interactional artworks' tactics. The development of *Individual Fancies* also stimulated the further development of a 'artist as host' metaphor which reflects both production process, and a more detailed taxonomy which is capable of graphically representing the 'shape' of different interactional artworks, and could reflect the 'character' of the artwork/host.

The two different strands of practice dealing with interactive art (the development of *Serious Games*, and of *Individual Fancies*), interweave with the more theory-based elements of research (Case Studies, taxonomy development and background reading). Each informs the other, and should be seen as different ways of exploring the same set of questions, testing these questions in different circumstances. The set of questions became narrowed down through the research processes (and selection processes for *Serious Games* to the key question of collective rather than individual use of interactive artworks, and this question was elaborated and explored further through *Individual Fancies*. It was decided to return to formal Case Studies as a common conclusion to the strands of research, this time concentrating very specifically on the Key Question of collective use: One Case Study on the most relevant artwork in *Serious Games*, and one on *Individual Fancies*.

Chapter 8 Case Study 3: *Resonance of 4* in *Serious Games*

Curating the *Serious Games* exhibition of interactive work provided many opportunities for informal observation and development of ideas. The results of Case Studies 1 and 2 affected the selection of work for the exhibition, in that it was determined to include work which was purposely designed to be better for several people than for one. The computer-based artwork eventually chosen which embodied this most firmly was Toshio Iwai's *Resonance of 4* (see Appendix I), and a short formal case study was made of this artwork only. As well as relating to *Serious Games* and a progressively focused series of Case Studies, this Case Study also relates to other research strands:

By this time, the artwork *Individual Fancies* was also in production, with a key parameter relating to interaction between people. The purpose of Case Study 3 was to examine a narrow band of variables relating to interaction between people (an area of interest narrowed down to 'the Key Question' from Case Studies 1 and 2. It would test whether an artwork which aimed at encouraging interaction between people would do so, and if those people would show increased use times. The case study was also hoped to serve as a future point of comparison with *Individual Fancies*, an artwork with similar aims.

8.1 The variables

Resonance of 4 was in an exhibition of eight interactive artworks at the Laing Art Gallery, a general city-centre museum and art gallery. The exhibition *Serious Games* within the gallery had a small entrance fee (£2/£1). (See also Appendix IV for information on *Serious Games*.)

The artwork involves four projections of grids approximately 1m square, on the floor of a room, each with an adjoining plinth with a mouse on it. By clicking the mouse each person can fill in certain squares on the grids. Each square effectively creates a note. Each of the 4 grids is a different electronic musical 'instrument' (bass, flute-like, etc.), and all the grids are synchronised in time, so that short repeating tunes can be created. A button on each podium 'wipes' the grid to start again. Each

person controls one grid, and can try to co-ordinate with the other instruments. There are four speakers attached to the walls, playing the separate instrument of the nearest mouse podium, so that the user hears their own instrument slightly louder than the other instruments The artist states that co-operation is a desired product of the artwork: '... the installation would not only perform a resonance of sounds, but would also create a resonance of the minds of the four players.' (Iwai, quoted in Brown *et al.* 1996, p.44).

Resonance of 4 had its own room within the gallery 6m x 6m, with very subdued light and black walls (see Figure 25 and Figure 26). People were not very visible to each other due to the very dim lighting.

An estimation in advance of 'how long to see most of it' was 9 minutes, an estimation of how long to get a 'reasonable experience' was 5 minutes.

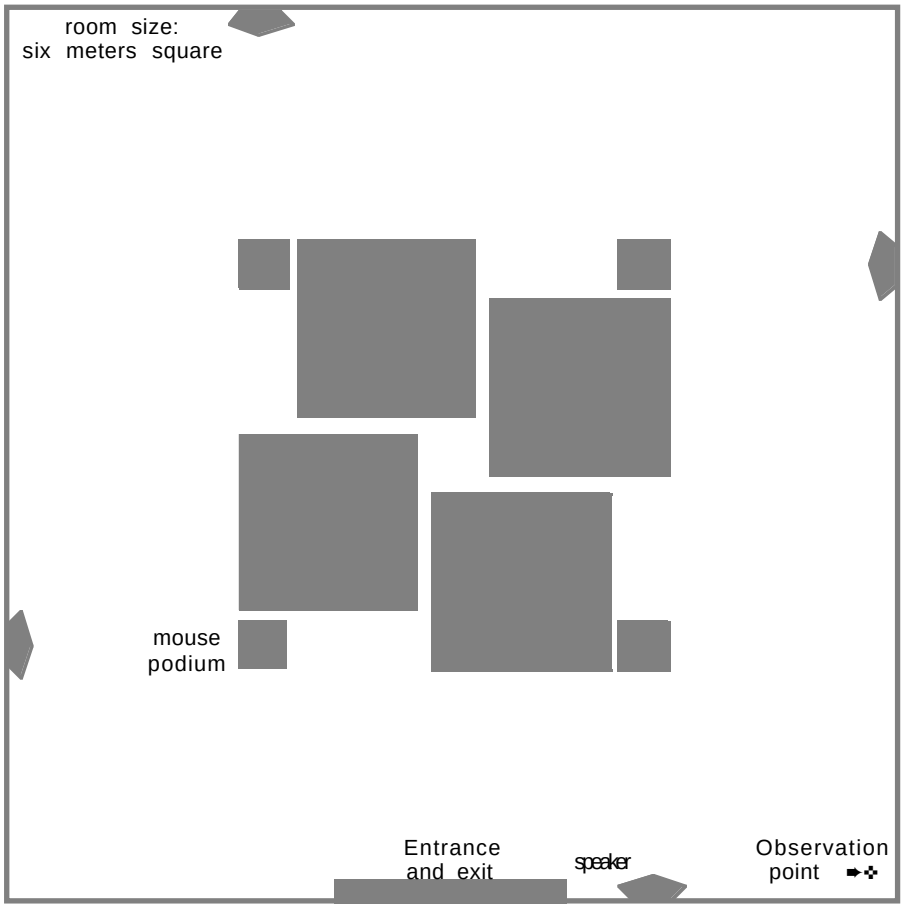


Figure 25: Diagram of *Resonance of 4* gallery layout

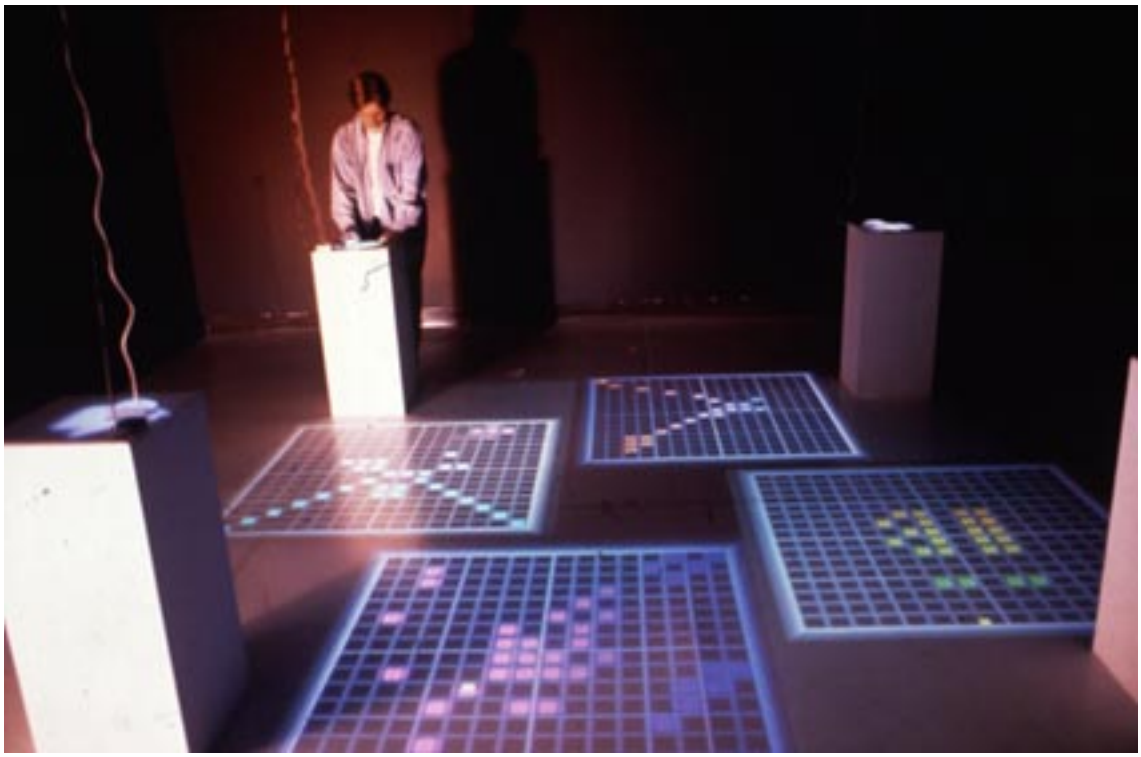


Figure 26: Installation shot of *Resonance of 4* in *Serious Games*

{VIDEO CLIP ON CD} 5: *RESONANCE OF 4* CLIP.

8.2 Methodology

The observations were carried out on Saturday 25th January 1997, 11 am-12.30, and 1.15 pm-3.45 pm. 25 people were tracked. Over those periods, 79 people entered the room, giving an average of 19.75 people per hour for the whole exhibit, or 4.9 'people per user place' per hour (considering there are 4 mice/user points), a bit higher than the previous 2 case studies (4 'people per mouse' for *Silver to Silicon*, and 2.2 people per exhibit per hour at *V-Topia*). As the space was much smaller, the overall impression of this study was that it was much 'busier' than the previous Case Studies.

This Case Study was observational only, using a form trimmed down and simplified from previous case studies, with the same definitions of 'watching' and 'using' (see sample of form in Appendix IIIc). Likewise, if people interacted with each other it was recorded. Due to the nature of this artwork, it was also recorded whether this interaction was V for 'verbal' (that previously categorised as general 'interaction'

between people, including obvious gestures and touches), or O for 'collaborative' (i.e. a very obvious effort to co-ordinate the sounds/images between two or more people. This is a rather imprecise factor to judge, but this was only marked down if very obvious evidence was observed, involving talk, gestures or looking back and forward to co-ordinate shapes and patterns. Therefore these judgements are very conservative indications of the degree of 'collaborative interaction' occurring.)

The people tracked were the first people to enter the room, 30 seconds after the last tracked person left. Gender and ages of the tracked subjects were estimated from sight. Observation was carried out by the author, with a stopwatch, sitting quietly in a dark corner in dark clothes. The observation was not announced to the subjects.

This case study was carried out without questionnaires, because the narrowing down of the area of study to interaction between people during use of artwork, meant that the relevant information could be gathered by observation only, without the possible disruption to an art gallery created by wielding a clipboard. The questionnaire responses had informed previous Case Studies, but were not particularly relevant to the Key Question. However, gender and ages were estimated, and group composition recorded, in order to provide a basic comparison between case study samples.

8.3 Results

Only 2 (8% of sample) of the tracked subjects did not have hands-on use of the artwork. Both were females in groups including children, and in both cases all four places were being used. They watched/waited for 39 and 50 seconds.

The average (mean) watch/wait time was 1 minute 25 seconds, and the mean use time (by those who used it) was 8 minutes 44 seconds (sample standard deviation 10 min. 40 sec.), well above the estimation of the time taken to get a 'reasonable experience'. Only one person (of those who used the artwork) used it for less than 30 seconds — a lone male of the 61 plus age bracket who used the work for 13 sec.

Demographics of sample

The genders and ages of the sample were more or less comparable to the sample of previous case studies. The subjects tracked in this study, however, were more likely

to be with other people than in the previous studies (84% compared to a maximum of 59% in previous case studies, Figure 47, p.181). This should be borne in mind (along with the fact that the artwork has a higher 'people per hour' score than other artworks) when considering the results, as arguably, more interaction between people is likely to take place when there are more people around, and more people in groups rather than alone.

Factors connected with duration of use

In relation to demographics (see Figure 27), *Resonance of 4* showed a much more marked difference in use times in relation to gender, than shown in previous case studies (Males averaged 14 min. 20 sec., Females 5 min. 8 sec.). The reasons for this may be varied, including the very nature of the artwork (the grid/logic/number based structure perhaps appealed to men more). It may be the fact that a higher percentage of the sample were in groups, often with children, and women perhaps tend to encourage their children to use it rather then themselves. However, a differential also applies to lone males and lone females (lone males mean of 4 min. 55 sec., lone females 1 min. 33 sec.).

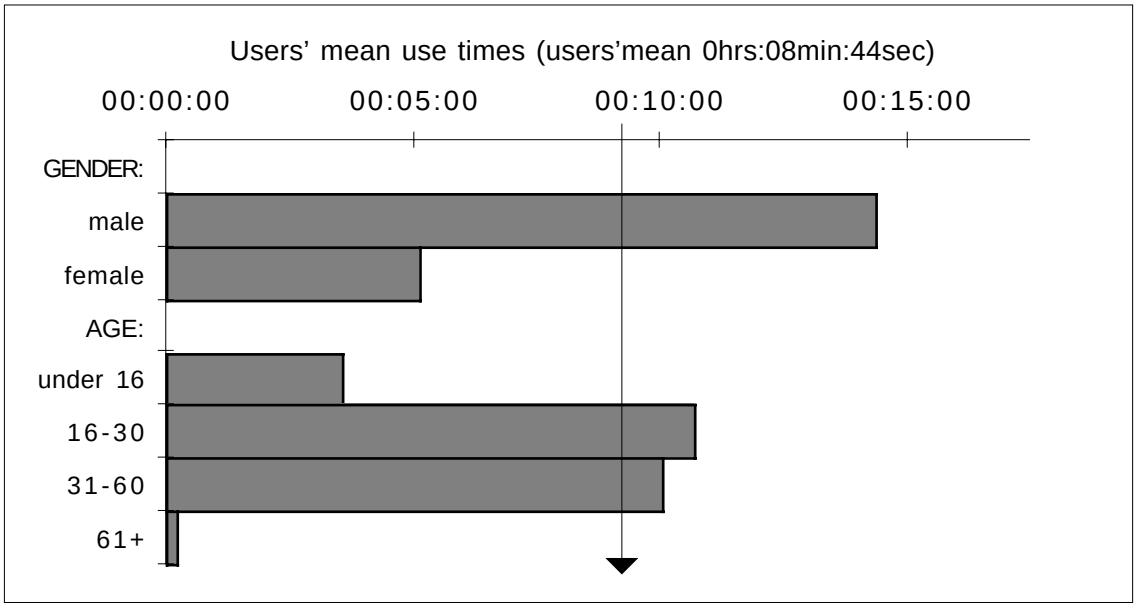


Figure 27: *Resonance of 4*; demographics in relation to average use times.

Factors relating to interaction between people

The percentage of all users who were observed to be interacting with other people during their use of the artwork is the highest of those artworks observed thus far

(65% with the nearest rival *Mirror Images* with 45%). However, in order to provide a more equitable comparison with other artworks were the sample contained more lone people, the percentage of loners, and of groups (those with others) should be compared (Figure 47, p.181):

Here, *Resonance of 4* is the first artwork to show *any* loners interacting with other people (25% is actually one of four lone users in the whole sample — rather a small sub-sample for statistical significance, but perhaps an interesting sign). However, if the percentage is examined of those who were with others, who interacted with other people during use, (perhaps a fairer comparison with other artworks) then 74% is topped by *Mirror Images* (83%). So, *Resonance of 4* could be said to have been fairly successful in its aim to encourage interaction between users, but that some artworks where this wasn't necessarily the intent, were also successful in producing interaction between people.

Resonance of 4 does, however, show the hitherto unobserved phenomenon of loners interacting with strangers: two people (both males, one loner) interacted with a stranger (someone with whom they had not entered the gallery), and both showed 'collaborative' interaction, with one showing general interaction also. Only one interaction with strangers had been observed previously in the Case Studies: in *Silver to Silicon* one person (who entered the gallery with other people), interacted with a stranger.

When concentrating on the question of interaction between people, it may be useful to examine the patterns in more detail: Eight (3 female, 5 male) of the 23 users (35%) were judged to be 'collaborating' on co-ordinating their music. Rather less than might be expected considering this as a major aim of the artwork. Some anecdotal reports are perhaps relevant here: Whilst observing the artwork, the author was approached only once by an audience member, who assumed that the author was an attendant. The man in his forties had entered the space with his daughter of about thirteen years old, and after a few minutes of his daughter using the work (but without talking with his daughter) approached to ask if the other three grids (being used) could be turned *off* so that just his daughter's grid was audible, because 'she plays the violin' and the other grids were 'interfering' with her tune. The other anecdote refers to a boy of about ten (not tracked) who used the artwork for about five minutes. On leaving he was overhead to say that the work was OK but it was annoying that other peoples' tunes disrupted his tune. The degree to which people *want* to collaborate is perhaps overestimated. This may or

may not be attached to national characteristics relating to reserve, co-operative skills etc. The two subjects who spent longest on the artwork, and interacted 'generally' and 'collaboratively' with other people (with one interacting with a stranger) were both non-English — having Dutch/Spanish accents respectively.

Two of the eight subjects who 'collaborated', did so without showing 'general' interaction (i.e. they showed efforts to co-ordinate shapes and tunes but without gesturing and talking to the other people.)

When considering how interaction between people relates to subject use-times, the findings appear to be in line with the artist's intention for the artwork experience to be enhanced when people interact/collaborate with each other (see Figure 28).

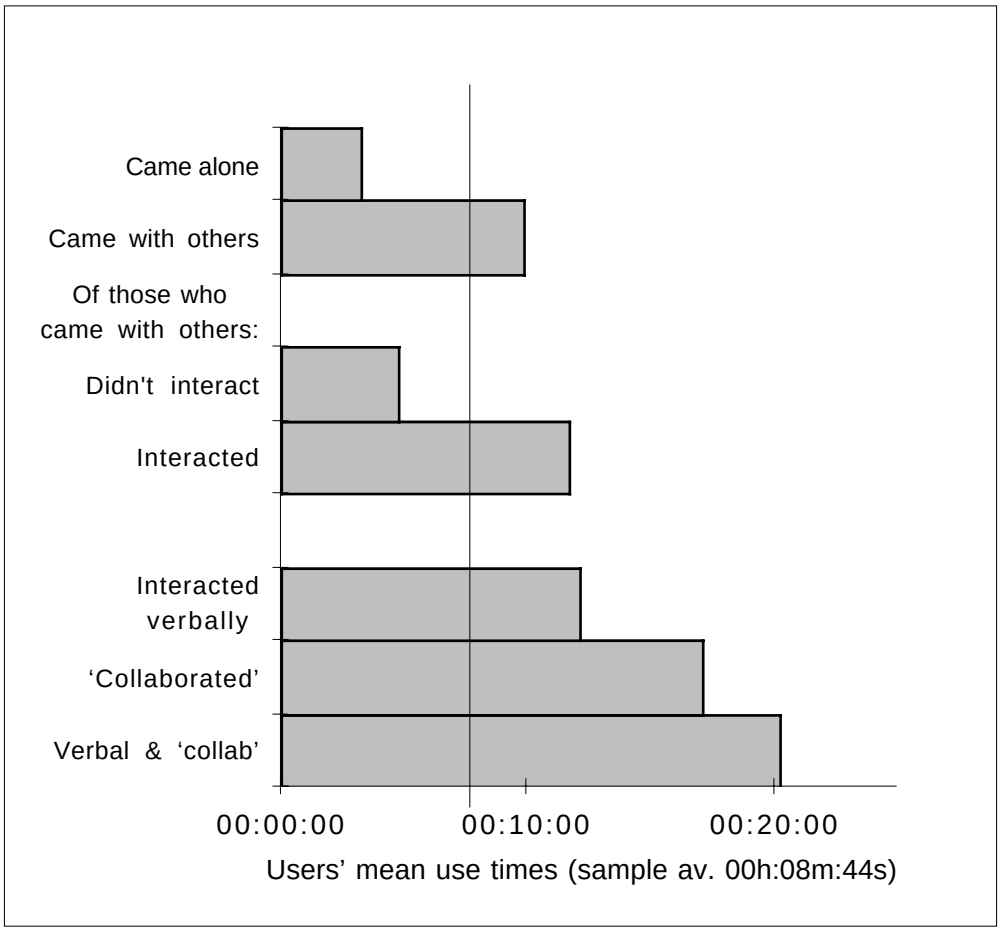


Figure 28: *Resonance of 4*; Interaction between people related to average use times

Thus those who came alone show shorter than average (mean) use times, and those who came with other people show longer. Those who interacted with other people also show longer than average use times. If this 'interacted' category is further

subdivided into those who 'generally' interacted, and those who showed definite 'collaboration' of tunes and images, then the 'more interaction' subjects show, the longer the mean use times (see Figure 28).

These findings are of course suggestive rather than conclusive. It could be that those who are prone to use the artwork for longer, discover more to interact with others about, rather than *vice versa*.

8.4 Conclusions from Case Study 3

The major conclusions from Case Study 3 (as informed by the Case Studies thus far) can be briefly summarised as:

- That *Resonance of 4* shows, as intended, a reasonably high level of interaction between users (65% overall).

- However, this figure is not greater than that for *Mirror Images* when considering only those who are with other people. This suggests that interactive artworks can enable interaction between users even when not intended.

- *Resonance of 4* shows the highest occurrence of interaction with strangers during use, of any artwork studied so far (9%; 2 of 23 users), but the low figures suggest that interaction between strangers is very difficult to achieve.

- The occurrence of interaction between people is associated with longer use times, and the 'more' interaction, the longer the use times.

- The percentage of users who showed 'collaboration' in their use, as intended by the artist, was 35%, which suggests that collaboration is also fairly difficult to achieve, even if intended.

Overall, the results suggest that the key aims of the artwork *Individual Fancies* (of encouraging interaction between users, and having the interaction enhance the experience of the artwork), may be more difficult to achieve than assumed, especially concerning interaction between strangers. The results had a direct affect upon the final stages of development of the artwork, informing decisions to

add more 'hints' given by the 'voice of the table', and making the hints sequentially much more obvious as time elapses.

Chapter 9 Case Study 4: *Individual Fancies*

Making a Case Study of *Individual Fancies* was not to 'test' the work for generalised 'success', but to follow on the strands of research which had progressively come to refine the area of research down to the key questions of interaction *between* users of an interactive computer-based artworks.

The development of *Individual Fancies* had been an exploration of those questions by art practice, and the Case Study was another exploration of the questions a chance to compare some actual patterns of audience use against other artworks studied, and against the starting parameters, and predictions for the work.

9.1 The variables

Individual Fancies was shown for one full day at the Reg Vardy Gallery, in the University of Sunderland School of Art, Design and Communications. The Gallery is a visual art gallery, showing national and international artwork, for example, work by Finnish glass artists, and the photography of Pradip Malde. Only a small proportion of the exhibitions are of work connected with/produced in the University itself, and this exhibition was a specially arranged event between shows, for which publicity was done specially (see Appendix Va). Thirty A4 posters and 100 A5 flyers were distributed to administrative and non-art staff (for example nursery staff) within the University, and 150 A5 flyers were hand delivered to residential and small office addresses within half a mile of the Gallery.

The gallery, being within a University building, was obviously rather different from the previous gallery venues, with a different usual audience, but the gallery itself is a conventional gallery space, with wood parquet floor and white walls. The clientele are likely, (but not guaranteed) to have more knowledge of art practice than an average gallery-goer, though not necessarily of interactive computer-based art installations, as there is not an established tradition of this within the University.

The artwork was the April 1997 version of the interactive tea table *Individual Fancies*, described in more depth in Appendix Va. *Individual Fancies* was the only artwork in the gallery, and was installed as shown in Figure 29 and Figure 30. The

entrance and approach was lit, and the artwork was lit by the overhead projection, and light bouncing off walls.

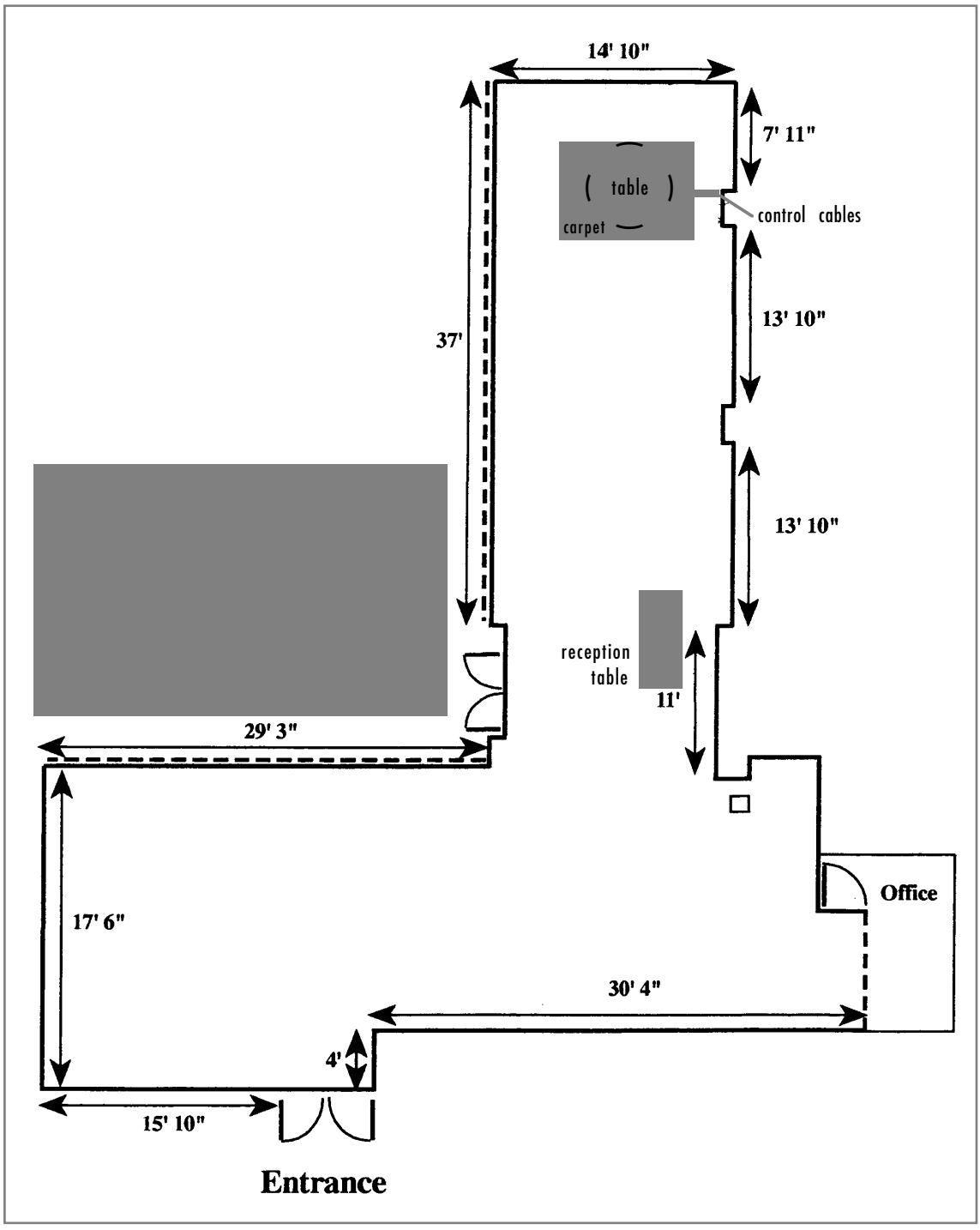


Figure 29: Plan diagram of installation of *Individual Fancies* at Reg Vardy Gallery

Figure 30: Installation shot of *Individual Fancies* at Reg Vardy Gallery

9.2 Methodology

The observations were carried out on Thursday 17th April 1997, 10 am-12.30 (Carole Baker), and 12.30 pm-5 pm (Beryl Graham). The observation point was the reception table. Twelve subjects were tracked by Baker, six by Graham, eighteen people in total. Over those periods, 83 people entered the gallery (*not* including an infant school party of 20), giving an average of 11.86 people per exhibit per hour, or 2.97 per 'user place' when divided by the four places at the table, compared to 4 (*Silver to Silicon)*, 2.2 (*V-Topia* artworks), and 4.9 (*Resonance of 4*) 'people per user place per hour'.

The method was designed to echo that of the methodology for Case Study 3, *Resonance of 4* being the artwork studied thus far which was most similar in intent to *Individual Fancies*. The same form was used for observation, with the same definition of actions as previously, but the differentiation of 'interaction' into 'general' and 'collaboration' was not followed, as not applicable to this artwork. The first 2.5 hours of observation were carried out by Carole Baker, a Ph.D. student at the University of Sunderland, in order to provide a more objective check on

observational method. Graham was also present at the reception table during Baker's observation, recording the number of people entering the gallery. The Graham observations were made alone. The records of Baker and Graham were compared to cross check the reliability of the more subjective judgements (i.e. the occurrence of 'interaction' between people). Eight of the twelve Baker subjects were recorded as interacting with other people, compared to five of the six Graham subjects (four of the six would have been an exactly equal percentage).

The observation differed from Case Study 3 with respect to the difference in venue — being a college gallery, even if subjects entered the gallery alone, they may know the other people in the gallery already. Therefore, if any subject was observed interacting with a 'stranger', they were asked on exiting the space whether they already knew the people with whom they had interacted. Only if they stated that they didn't know the others already, was the 'stranger' interaction recorded on the form.

Because of the location of the gallery, some of the audience were people who knew the work well, and had seen prototypes, and wanted to talk about the work with the author. If these subjects were tracked, their records have been omitted from the data examined (as unrepresentative), as were the odd occasions when a malfunction necessitated an intervention from the attendant. Likewise occasions where an attendant's help was needed (as for the school party) were also omitted/not included in the data.

Occasionally reassurance was requested from the attendant, for example 'Is this it?' or 'Can you sit down?'. In which case the attendant said 'Yes' or 'Help yourself' of some other similar reassurance. If asked 'What do you do?' the attendant was instructed to say 'It will give you hints, have a go'.

Anecdotal notes were also taken by the author, and are included in Appendix Va. The people tracked were the first people to approach within 3 metres of the tea table, 30 seconds after the last tracked person left. Gender and ages of the tracked subjects were estimated from sight.

An estimation in advance of 'how long to see most of it' was 7 minutes, an estimation of how long to get a 'reasonable experience' was 3.5 minutes. These estimates were rather difficult, as the more people who use the work, the longer it takes for the table characters to reveal their series of monologues. Each character's

complete set of monologues (up to the 2nd hints to talk to each other) takes about 1 min. 30 sec. to get through consecutively. Also, the desired scenario of users sitting talking at the table after the characters have finished, means that the fullest experience could last for quite a long time.

9.3 Results

Only 2 (11% of sample) of the tracked subjects did not have hands-on use of the artwork. Both were males (one a loner), and in both cases three places were being used at the table (i.e. there was one vacant space). They watched/waited for 2 min. 1 sec., and 34 seconds respectively. It may be that people are unwilling to join other groups who are already at the table and could be seen as 'owning' it (rather like being unwilling to join an occupied table at a cafe).

The average (mean) watch/wait time was 34 seconds, and users' mean use time was 7 minutes 48 seconds (sample standard deviation 4 min. 40 sec.). Nobody who used it, used the work for less than 30 seconds — the minimum was 1 min. 22 sec. These times were well above the estimation of 7 minutes to 'see most of it'.

Demographic of sample

As might be expected from a University-based gallery, the ages of the sample were more preponderantly in the 16-30 age group than previous studies, but not too disparate in terms of gender (see Figure 44). In terms of the 'loners/with others' balance, the subjects tracked in this study were less unusual than the *Resonance of 4* sample (see Figure 47).

Factors related to duration of use

In relation to demographics (see Figure 31), *Individual Fancies* showed only a slight difference in use times in relation to gender, (males averaged 8 min. 45 sec., females 7 min. 13 sec.). There was a bigger difference in relation to age group (the 16-30 group showed a mean of 5 min., the 31-60 group a mean of 11 min. 23 sec.).

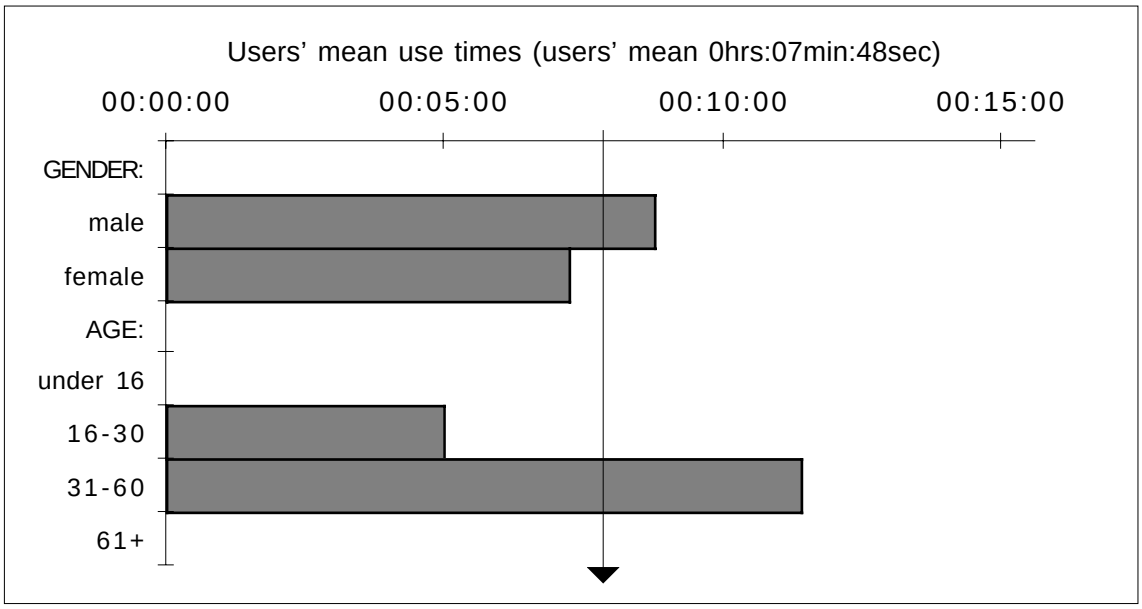


Figure 31: *Individual Fancies*; demographics related to use-times

Factors relating to interaction between people

The percentage of the whole sample who were observed to be interacting with other people during their use of the artwork is the highest of those artworks observed thus far (81% with the nearest rival *Resonance of 4* with 65%) (see Figure 32).

Individual Fancies also scores highest thus far (40%) in occurrence of interaction in users who came to the gallery alone (* in order to provide a more equitable comparison, only those who entered the gallery alone and interacted with someone who they stated that they had not known already were included in this category). However, if the percentage is examined of those who were with others, who interacted with other people during use, then 82% is topped by *Mirror Images* (83%).

Individual Fancies also shows the *Resonance of 4* phenomenon of loners interacting with strangers: three people (2 males, 1 female; two loners, one with others; 19% of users) interacted with a stranger (someone whom they had not met before).

When considering how patterns of interaction between people relate to subject use-times, the findings appear to be in line with the artist's intention for the best experience of the work to be when people interact with each other (see Figure 33). Thus those who interacted with other people show much longer average use times than those who did not, whether they came with others or not. The only perhaps

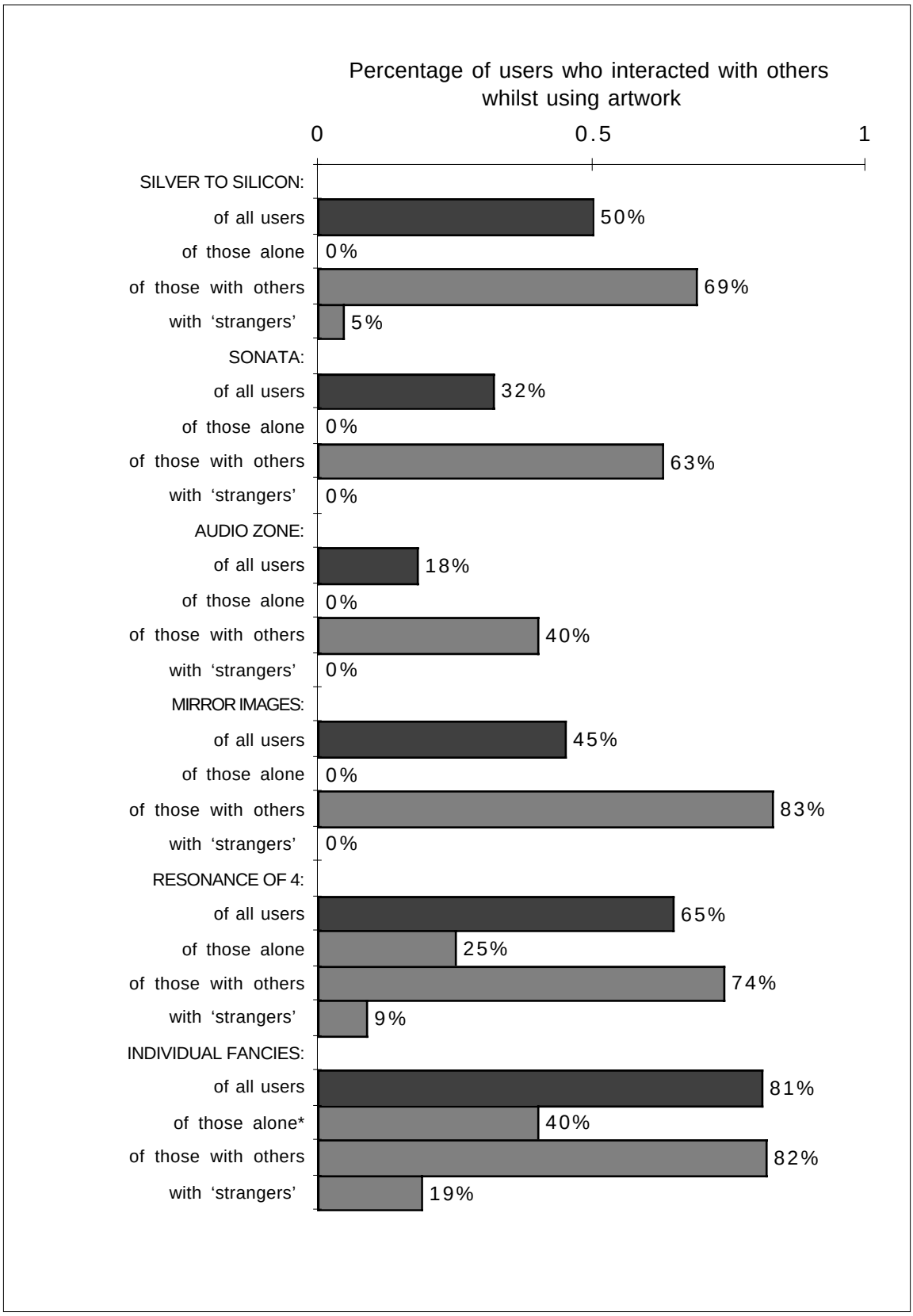


Figure 32: Percentage occurrence of interaction with others.

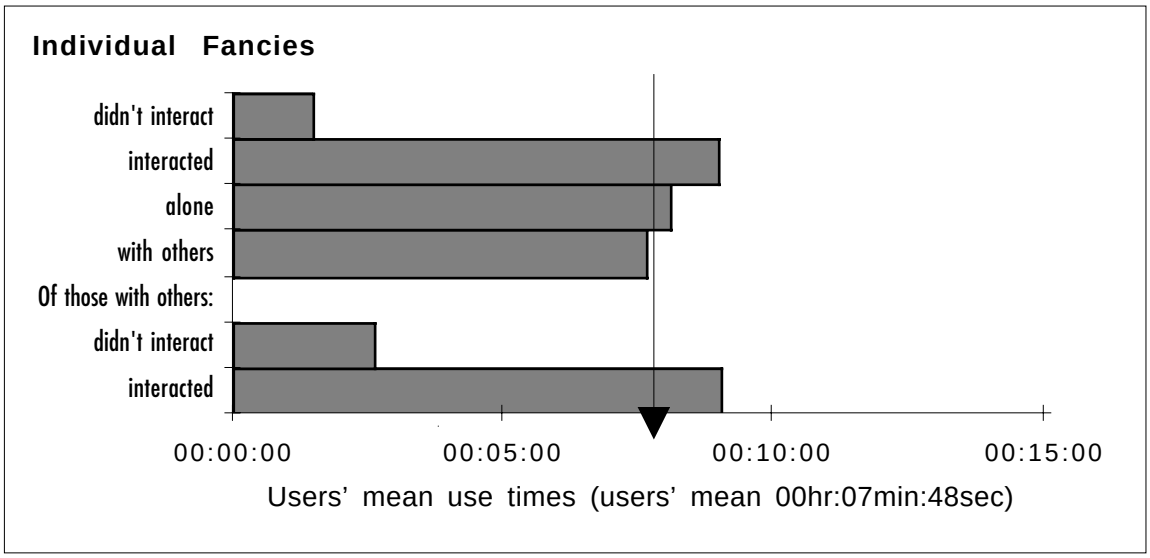


Figure 33: *Individual Fancies*; interaction related to use times

surprising factor is that those who came alone spent slightly longer than those who came to the gallery with others.

The causal natures of these correspondences, in relation to *Individual Fancies*, are of course debatable: those who spent only a couple of minutes using the artwork, were unlikely to have reached a point in the artwork where interaction between people is most encouraged. The work is designed to be more 'rewarding' as time goes by (for example, the characters getting more upbeat, the cakes appearing, and then quirky animations such as the hearts of the Jammy Dodgers beating). Like *Resonance of 4*, it could be that those who are prone to use the artwork for longer, discover more to interact with others about, rather than that those who are prone to interact with other people, use the work for longer.

9.4 Comparing predictions and original parameters with results

In the same way as other artists were asked to predict certain patterns of use of their work, to be compared with findings, predictions were made one week before showing *Individual Fancies*. These predictions were related to the major parameters for the artwork outlined in 7.2.2. The parameters and predictions are in bold, with the findings compared below in regular type:

Parameter 1)

To make an artwork which would encourage interaction between people.

Prediction: That the artwork should encourage a higher percentage of users to interact with each other, than the other studied artworks.

From Figure 32 it can seen that is was achieved over all of the sample, although for those who came with others, *Mirror Images* showed a slightly higher percentage.

Parameter 2)

To make an artwork where the experience was enhanced by multiple simultaneous use, and/or co-operation between people.

Prediction: That average use times will be longer if people interact with each other. That average use times will be longer if more people are at the table.

The first part of this was achieved, as seen in Figure 33. The second part can be seen analysed in Figure 34. Mean use times were calculated for users, depending on the maximum number of other people sitting at the tea table during their use period.

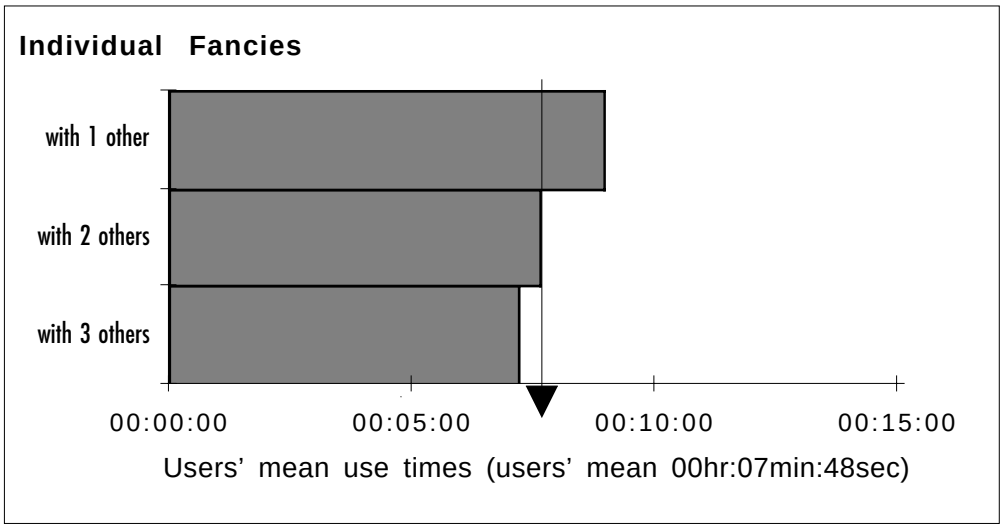


Figure 34: *Individual Fancies*; mean use times when a maximum of one, two and three other people are sitting at the tea table.

This would suggest that in fact average use times get slightly shorter as the number of other people at the tea table gets greater — the opposite of that predicted. This is particularly surprising considering that with more people at the table it physically takes longer to hear more character's monologues. The reasons for this could be varied: perhaps 'tea for two' is more cosy and prolongs

conversation rather than a 'crowd' of four; perhaps more people at the table means that it is more likely that strangers are sharing the table, meaning less interaction; it may be that with more people, at least one person has seen what to do with the teapot etc. so less time is spent finding out what to do.

The minor parameters were not necessarily relevant for testing, but stimulated some less certain predictions:

Prediction: That women might use the artwork for longer than men.

This was not the case (see Figure 31, p.130). Men used the artwork for slightly longer than average use times. Neither were women more likely to interact with other people. 80% (8 of 10) women users interacted with other people, whilst 83% (5 of 6) of male users interacted with other people. It had been thought that women might find the tea table interface more user-friendly, and be less inhibited about interacting, but this was not borne out.

Prediction: That older people might use the table for longer than younger.

This was definitely the case. Although the youngest and oldest age categories were not represented in the sample, there was a large difference in relation to age group (the 16-30 group showed a mean of 5 min., the 31-60 group a mean of more than twice that: 11 min 23 sec.). If also considering the proportion of the age groups who interacted with each other, this reinforces the pattern: 55% of the 16-30 group interacted with each other, whilst 100% of the 31-60 group did. This could be seen as affirming parts of parameters 5 and 6:

5) That it should be accessible to technical neophytes, but those with life experience might be privileged. It should be 'approachable'.
6) That it should be aimed at adults rather than children.

Alternatively, it may just be that older people take longer to use the work.

9.5 Conclusions from Case Study 4

The major conclusions from Case Study 4 (as informed by the Case Studies thus far) can be briefly summarised as:

- That *Individual Fancies* shows (as intended in the parameters, and as predicted) the highest overall percentage of users who showed interaction between users (81% of all users).

- However, the percentage of those who were with others who interacted was higher for *Mirror Images* (83% vs. 82%). This suggests that interactive artworks can enable interaction between users even when not necessarily intended to.

- Both artworks which had interaction between users as a stated intent (*Resonance of 4* and *Individual Fancies)* had the highest occurrence of interaction between strangers. The low figures, however, (other artworks 0%, *Silver to Silicon* 5%, *Resonance of 4* 9%, *Individual Fancies* 19%) suggest that interaction between strangers is very difficult to achieve. This occurrence could perhaps be a distinguishing mark of artworks which intend interaction between users.

- The occurrence of interaction between people using *Individual Fancies* is associated with longer use times, although having more people at the table is *not* connected with longer use times.

Overall, the findings suggest that the key parameters and predictions for the artwork *Individual Fancies* (of encouraging interaction between users, and having the interaction enhance the experience of the artwork), have been at least partially attained ('enhancement' being a difficult aspect to define, extended use times have been taken as a measure of this).

The wide variables and uncertain causal effects of interactive artworks, however, mean that a level of unpredictability will always apply, and that observational data should always be seen in a wider context. The Case Studies have been intended to be a progressively more focused series of more limited range but greater depth. The scope for further observational case studies is also great. In particular, attempting to differentiate different kinds of interaction between people might be a useful further development.

At this point in the research, a new study of interactive artworks at the Glasgow Gallery of Modern Art was discovered (Bain, 1996), with some relevant data. Despite the gallery's name however, some of the exhibits in the interactive gallery could perhaps be described less as art and more as 'general science museum type interactives' such as a 'giant pinscreen'. In a study of a show of around 10 exhibits, where 17% of the sample users were alone, 64% were observed to be 'talking with others whilst interacting' (perhaps roughly comparable to *Individual Fancies*' 81% of all sample), and 5% didn't interact with the exhibits at all. A fairly favourable comparison considering the 'popular' nature of the gallery's choices.

Chapter 10 Conclusions

10.1 In general

In considering conclusions for the research as a whole, perhaps the first thing to underline is the limited range of the research within the vast range of variables applying to interactive computer-based art. When considering art, the range of immeasurables is always to be borne in mind — the dynamics are delicate, the variables shifting and the data always specific to particular artworks and situations. In such conditions, Case Studies tend to be suggestive rather than conclusive. Nevertheless, the research has uncovered some interesting suggestions, and hitherto unpublished findings in a field where there is very little published information of this kind.

To briefly recap on the research as a whole (see Figure 1, p.17): From a starting point of anecdotal opinion represented by the chapter in Appendix II, the three broad questions A, B and C (see 10.3) were explored in Case Studies 1 and 2. From those findings the research was refined down to the major area of interest, the Key Question based on Question B, concerning individual versus collective use of artworks, and interaction between users. The curating of *Serious Games* and the making of the artwork, were both informed by this Key Question, and in turn furthered the research on the Key Question. The strands of research interwove to further the development of the taxonomy, and to explore its application. The final Case Studies 3 and 4 brought together all strands concentrated on the Key Question. The approach can be seen as a 'hybrid' approach to research, where more traditional statistical studies, and art practice, both 'suggest' ideas which go forward to refining the concepts and narrowing the thrust of the research area. The development of useable metaphors, the identification of some structures, and the description of some general patterns of use in gallery settings are some of the results of this research, which may be of use to artists and curators.

Because of the interweaving strands of research, it may be useful to examine conclusions in several sections.

10.2 Is the taxonomy of 'conversation/hosting' useful when applied?

The taxonomy of 'conversation/hosting' was not simply applied to the practice-based strands of research, but was further developed *by* them. In particular, the production of the artwork developed and solidified the metaphor of 'hosting' and stimulated the further subdivision of the 'Verbal Exchanges' category of the taxonomy (4.2) into simple graphic representations of the degree of creative input from artist, audience, and between the audience members (see 7.2.3).

Above all, the use of the common language metaphor of 'conversation' encourages a very critical view of interactive computer-based artwork. None of the artworks examined was judged to have achieved 'Real Conversation' — a category which is a possibly unobtainable end point but remains as a possible future aim — a check against the unrealistically 'grand claims' made for interactive computer-based art. Because of a general awareness of imbalances in conversation (people who don't listen, or who only talk on their own subjects) the metaphor is also a usefully everyday one to apply to the different levels of 'Verbal Exchanges' below that 'Real Conversation'. In applying these three categories (Talking Car, Voice Mail, and Hosted Chatline) to a range of artworks within the *Serious Games* exhibition, they were found to be a useful curatorial tool for analysing variety within a range of artworks. In addition, it was discovered that the 'more interactive' categories tended to coincide with the greater number of people who could use an artwork at the same time, which was a major factor in selecting works for the exhibition.

When the taxonomy was taken further by the 'host' metaphor, (the importance of which was realised by the production of *Individual Fancies)*, as Bell (1991) discovered, block categories were no longer applicable, but simple graphic representations of the levels of creative input from artist, audience, and between audience members, were mapped over time, giving graphic representations of different 'characters' of hosts.

As to how pragmatically useful these taxonomies may be to artists and curators, it is likely that (if used) curators might apply them towards the end of the curatorial process, i.e. if a vague unease is felt with the dynamics of how a show will work as whole it may help to analyse a set of artworks in this way. For artists, it may help to think about their role as a 'host' near the beginning of process: How 'controlling' a host do they want to be? Given that 'Real Conversation' can only take place

between real people, how much interaction do they want to take place between audience members? How might this work through time? (see 7.2.3). The metaphor is not necessarily always a scientifically very accurate one, with many applications of 'rules of thumb', but the pragmatic usefulness of it to artists and curators is perhaps reasonably memorable. The graphic sketch of a certain kind of interactive artwork as a 'sperm whale shape', for example, is perhaps more likely to be borne in mind during a process of selection or creation than a formal analysis (which tend only to be done at some later point).

Artists and curators, in line with the general healthy resistance of art fields to classification, could of course only use any such categorisation within a much wider context. The artwork *Rehearsal of Memory* for example, is one of the 'less interactive' artworks in *Serious Games*, but was nevertheless included as a powerful and engaging piece of artwork.

10.3 Comparing the three questions from the pre-research chapter (Appendix II), with the findings of research

The chapter attached in Appendix II was written before the formal research, and was based on anecdotal evidence, hunches, and informal observation of a range of interactive artworks. To compare the broad questions that were abstracted from this chapter, to the findings of the formal research, may be useful at this point.

Question A) Grand claims are made for interactive art, based on vague terms: How can we be more accurate about different types and aims of interactivity?

Perhaps the grandest claim made for interactive computer-based art are the claims that it is a 'democratic' artform. Some diverse claims for this, from a range of cultural debates, are outlined in Chapter 2. Whilst those invested in technological culture have a vested interest in presenting technology as positive and democratic, those from an art background also have a history of such claims on 'democracy'. In section 3.3, a history of claims for a 'democratic art' is traced from Post-Dada and Socialist Realism to Post-Modernism. Such historical and cultural contexts for 'grand claims', help to reveal the wishful thinking invested in both technological and artistic discourses about democracy. The value of computer-based art 'democracy' is perhaps likely to remain just as debatable as Socialist Realism 'democracy' in the long term.

Both a tempering of grand claims, and an increasing ability to differentiate between kinds of interactivity are, however, perhaps more likely to occur naturally with slowly increasing public familiarity with such artefacts, rather than by any particular effort by academics.

The taxonomy discussed above and in Chapter 4 could, however, be useful to those with a special interest, who need to be more accurate. The metaphor of conversation for defining a broad set of categories (including a category which is thus far unobtainable), plus the additional graphic representations which help to characterise in a more detailed way the kind of 'host' the artist is being. These taxonomies cut across the 'medium' or equipment used by the artwork, and are primarily aimed at those interested in the dynamics of interaction. Within this research they are usefully applied to computer-based artworks in gallery contexts, but could also be applied to other non-technology-based interactive artworks, and non-gallery-based artworks.

Question B) Interactive art tends often to be designed for one person. Is this necessarily an individualistic, isolating artform?

Perhaps the most surprising finding to emerge from Case Studies 1 and 2, was the frequency with which subjects chose to use the artworks with other people, and to interact with other people whilst using the work (Figure 58, p.192), even when there were other vacant spaces available (in *Silver to Silicon*), even when the work was very obvious designed to be used by one person only (especially *Sonata*), even when factors such as wearing headphones made it difficult to interact other than in gestures (*Audio Zone*).

This is the question which became the Key Question and research focus (see 10.4).

Question C) Many have problems interacting because of queues, lack of knowledge, lack of visual pleasure, or intimidation. How can this be addressed?

The findings of the case studies at least partially addressed some of these factors, and in general, the problems were perhaps not as great as assumed previous to the formal research.

Re problems interacting at all:

In the Case Studies, only a small percentage of those approaching within 3 metres of an artwork did *not* go on to have hands-on use of the artwork: *Silver to Silicon* 19% (5 people), all *V-Topia* artworks 0%, *Resonance of 4* 8% (2 people), *Individual Fancies* 11% (2 people), nine people in total of 153 in all samples (6%). The higher percentages of *Silver to Silicon* and *Individual Fancies* perhaps reflect the galleries' position where 'drop-ins' were more likely, as opposed to the other two venues which had an entrance fee and/or people were more likely to have made a special trip to see the show. Nevertheless, it is a percentage. As those who leave without using are also more likely to decline to fill in a questionnaire, there is very little information in these case studies about non-users (2 people from *Silver to Silicon* who didn't use, and filled in a questionnaire — hardly enough for statistical significance, or discerning any pattern.) The question of why non-users don't use therefore is still very open to further research.

Those who used the artworks also did not often give up quickly for whatever reason: only three of the 137 subjects who used the artworks (2%), used for less than 30 seconds, hence 'dabbling' was not as common as might be expected.

Re Queues:

'Queues' as such were not observed at any of the Case Studies, even though this included weekend observations (busiest times). Neither did the presence of other people waiting/watching appear to have any consistent connection with the duration of use (see Figure 35). *Silver to Silicon* and *Individual Fancies* showed shorter average use times when at least one person was 'watching/waiting' at some point during use. On the other hand, *Sonata*, *Mirror Images* and *Resonance of 4* showed exactly the opposite. Of the nine people (see above) who did not use the artworks, in only two cases were all the available interaction points occupied (the two people in *Resonance of 4)*. Whatever the reasons for not using an artwork if within 3 metres of it, lack of a vacant place surprisingly does not seem to be top of the list. Of course, people may be reacting to the situation from *more* than 3 metres away.

However, the occurrence of other people standing waiting/watching whilst other people used artworks was common. Whilst it may not often prevent people from using the artwork eventually, it is unlikely to be fun to hang around for extended

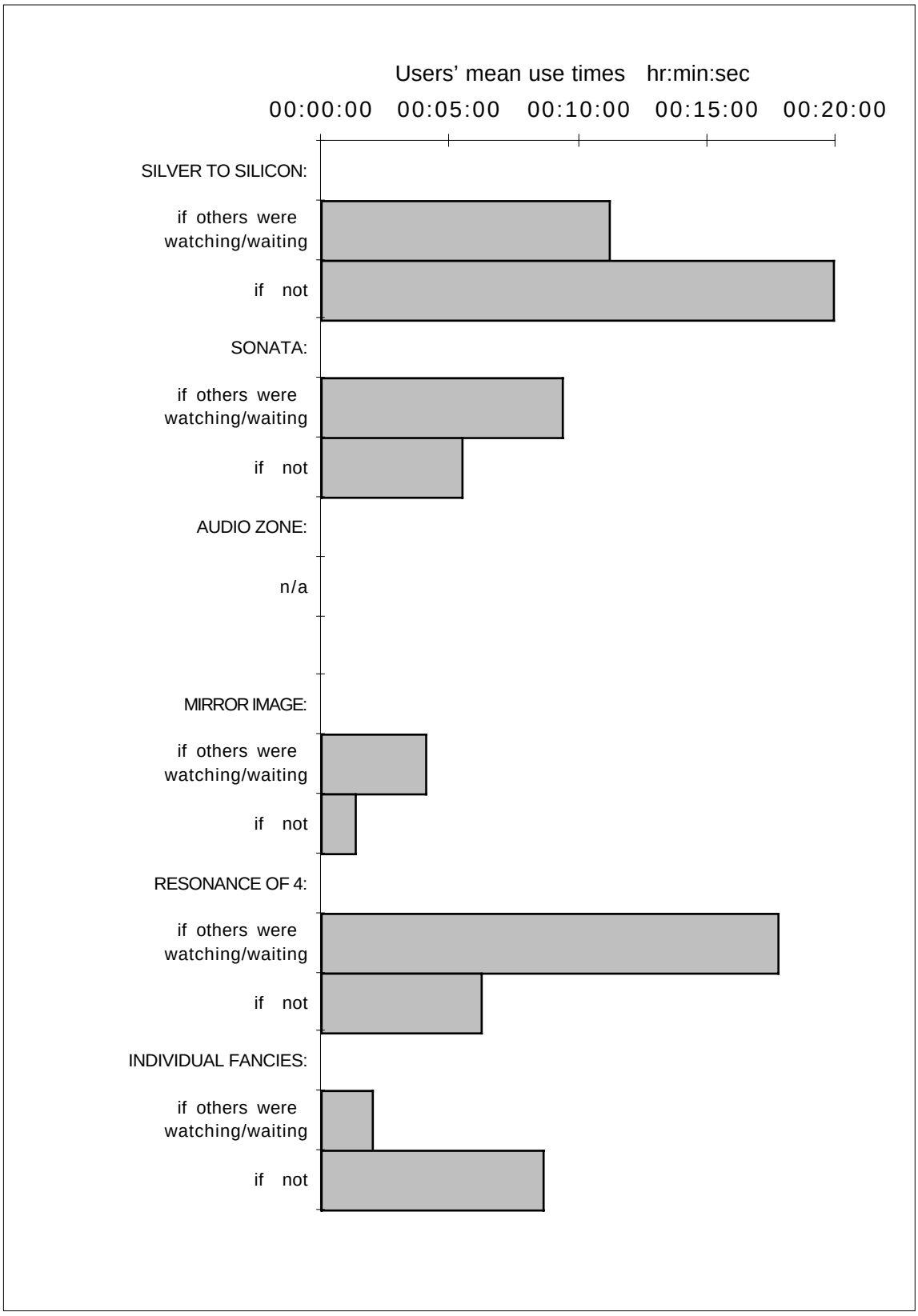


Figure 35: All Case Studies; use times related to presence of other people 'watching/waiting'.

periods. It was this concern with queuing which did partially inform the choice of some multiple-use artworks for *Serious Games*, for 'traffic flow' reasons.

Re: Intimidation:

Factors of intimidation are problematic to explore in case studies. There is the problem of *what* was intimidating: gallery; people; technology; smells; other people's accents; the dark, etc. etc. Questionnaires concerning intimidation are unlikely to get responses unaffected by factors of whether or not people want to admit being intimidated. However, some interestingly suggestive patterns can be extracted from the findings. Those who responded on questionnaires that they *did* feel intimidated/embarrassed, consistently showed shorter mean use times than those who said that they didn't (see Figure 36).

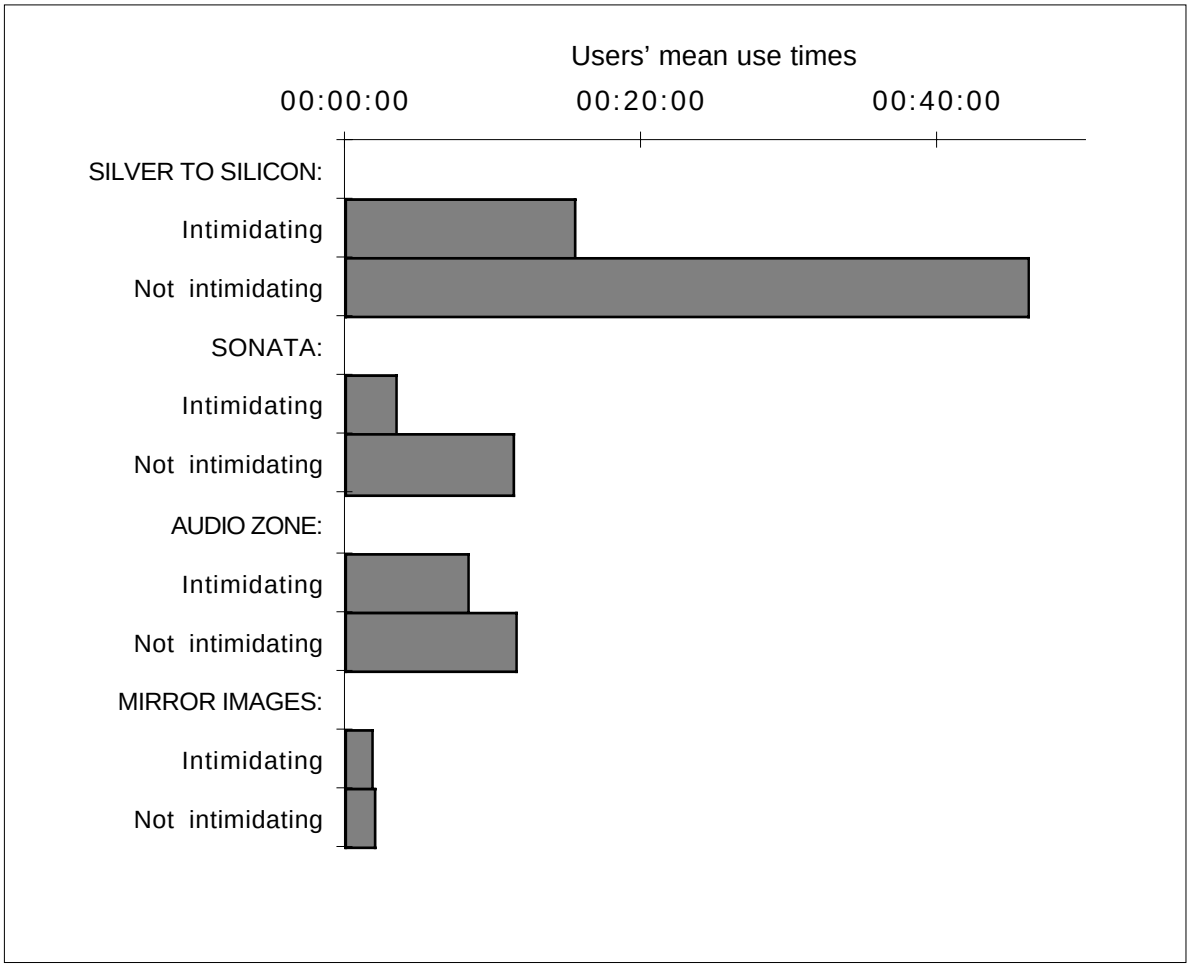


Figure 36: All Case Studies with questionnaires; responses to 'intimidation' question related to average use times.

The percentage of respondents saying that they were intimidated was always, however, in a minority (see Figure 47, p.181). This varied from 4% to 27% for the three artworks in the *V-Topia* exhibition space, suggesting that the artworks themselves (rather than the exhibition space) can have the potential for being more or less intimidating. As explored in section 6.2.3 (p.81) and 6.4, there are differences in gender responses to questions on 'intimidation' for different artworks, suggesting that men and women may be more intimidated by different factors, possibly related to self-consciousness about the body.

As factors of intimidation do seem to have a consistent link with shorter use times, these factors were borne in mind both when selecting artworks for *Serious Games* (in not selecting too many 'body-image' artworks) and in designing *Individual Fancies* so that the body is not too exposed, and to be generally 'comforting'. Anecdotal evidence from observational studies suggests that people do often appear hesitant or apprehensive when approaching interactive computer-based artworks. The factor is a continuing challenge for artists and curators, and perhaps a valuable site for further research.

Re: Lack of visual pleasure

This is perhaps a large question to tackle, and not one which the Case Studies shed much light upon, as the responses to questionnaire judgements on the 'quality' or value of the artworks were very inconclusive. It is rather something which the practice based strands tried to address: *Serious Games* included artworks which tried to vary the aesthetic tone by including light as well as dark spaces, plus fabric hangings, grass seed (*Zeromorphosis*), and large screen television as well as the more usual video projection. *Individual Fancies* includes cloth, carpet, and ceramic as well as horizontal projection.

In general the Case Studies and other research provided at least some suggested answers to these original questions, as well as helping to focus and define the Key Question which became the central thrust of the research. In general, the pre-research hunches of Appendix II were perhaps too pessimistic in terms of the fears that large sections of the audience might not use artworks, or use them for very short periods of time.

10.4 The Key Question

The research came to concentrate on this Key Question:

> If interactive computer-based artworks are made with a stated aim of encouraging interaction between people (at the same time and in the same space), do they do so, and in what ways?

This question developed from Question B (see 10.3). It came to be the focus, in preference to questions A and C, because:

- Questions A and C had been addressed by the findings of Case Studies 1 and 2 and other research, to reasonable satisfaction.
- The findings relating to individual versus group use, and interaction between users, were the most surprising and unpredicted findings at that point.
- In the development of a taxonomy, the 'most interactive' category of 'Real Conversation' was deemed *not* to be possible between an interactive computer-based artwork and its audience. However, 'Real Conversation' (of a verbal or other variety) *could* take place between members of the audience, making this an interesting site for study.
- The issues of individual versus group use, and interaction between users, had become important issues for *Serious Games*, and were a rich source of potential for the development of an artwork.

The question was thus explored in all strands of research. So ...

If interactive computer-based artworks are made with a stated aim of encouraging interaction between people (at the same time and in the same space), do they do so ... ?

As shown in the findings of Case Studies 3 and 4, overall *Resonance of Four* and *Individual Fancies* were more successful than the other artworks studied at encouraging interaction between people. *Individual Fancies* was designed with this primarily in mind, was informed by information from other research, and was the most successful at encouraging interaction between people. The development of *Individual Fancies*, using tactics including everyday objects as interface, not having users' bodies too 'exposed', a traditionally sociable structure of a tea table, a sociable production process, and a content explicitly encouraging interaction, appears to have succeeded with these tactics, but they are not of course the only tactics.

However, if a sub-sample of those who were with other people at the exhibition is taken, then a slightly higher percentage of these people interacted with each other during *Mirror Images*, an artwork which did not have this as a stated objective. Thus interaction with other people during use of interactive artworks can be seen as a surprisingly common phenomenon, even when not intended by the artist, and should be borne in mind by artists and curators in the field.

... and in what ways?

What is *not* a common phenomenon is interaction between strangers. This occurred very infrequently, (see Figure 58, p.192) but did occur most frequently in *Individual Fancies*, then *Resonance of 4* (the two artworks with a stated aim of interaction between people). It may be that in aiming to encourage interaction between people in general, interaction between strangers is rendered more possible. It might be interesting to examine any interactive computer based artwork which has a stated aim of interaction between strangers (if any such exists) to see if this phenomenon can be achieved more frequently by certain tactics.

In the case studies thus far, interaction between people was recorded in a simple yes/no fashion, apart from *Resonance of 4*, where an attempt was made to differentiate general interactions between people using words, gestures or touches, from interaction using the musical structures of the artwork. Interaction certainly is possible purely through the artwork (see 8.3) as opposed to also employing talk, touches and gestures. These findings also underline that interaction and collaboration are not the same thing. What may be useful for future research, are observational studies where different kinds of interaction between people are more closely examined — are they for example interacting to express embarrassment (such as "I can't work this"), instructing each other ("press that button"), wanting to share experiences — ("hey, look at that"), sharing opinions on the work ("this part is good"), collaborating ("if you do this and I do that, see what happens"), or some other agenda ("do you come here often?"). Interaction between people at gallery is perhaps as variable as interaction between people at a party, and the artist's role as 'host' can affect this to a certain extent, but never fully control it. The metaphor of 'host' developed through production of the artwork *Individual Fancies*, could perhaps act not only as a means of categorisation of artworks, but also of categorisation of ways of interacting.

Interaction between people was found to be associated with considerably longer than average use times in *Mirror Images*, *Resonance of 4* and *Individual Fancies* (those artworks which also showed the highest percentages of people who did interact with other people). However, *Sonata* showed consistently *shorter* average use times for the same factor, and *Silver to Silicon* and *Audio Zone* only showed longer times if only those people with others were considered. It could be that only those artworks where it is *easy* for people to interact show longer use times when people *do* interact (*Sonata* being the artwork most obviously designed to be used by only one person at a time.)

Some of the ways in which people interact with other (during use of interactive computer-based artworks in galleries) have therefore been mapped and explored, but by no means all of the ways, or the causal relationships proved.

In referring back to Cornock and Edmonds' taxonomy (see Figure 5, p.44), they further subdivide the category of 'Interactive' (or 'Real Conversation') into interaction with An Individual, Small Group, A Culture, and Cross Cultural. Given that the whole category of 'Interactive' might be unobtainable, how much more difficult might be the concept of successful Cross Cultural interaction be (as touched on in section 2.4, and p.48). Whilst *Individual Fancies* attempts to include references to a range of cultures, this research has not attempted to explore this important area. Wide scope for future research exists.

10.5 Concluding remarks, and suggested future research

As some of the first research in this particular subject area, this dissertation presents some new information concerning patterns of use of interactive computer-based artworks in gallery settings, suggests some possible pragmatic taxonomies, and explores in particular the theme of interaction between people whilst using interactive artworks. By using a fluid, multi-disciplinary, and hybrid approach, it is hoped that this research may be useful to practitioners in the field, both artist and curators, and that the findings may not become too quickly outdated or irrelevant.

The research came to concentrate on artworks which encourage interaction between people, as a means of approaching the boundary of 'real conversation', which currently cannot occur between programmed artwork and audience, but could occur between members of the audience. These artworks also have the

advantage for quantities of people in gallery settings of being able to engage several people at the same time. However, these kind of artworks should not be seen as 'the answer' to the problems of showing computer-based interactive artworks in gallery settings but merely as one tactic. Indeed a danger of this tactic could be seen as a 'populism' in approaches towards experiencing artwork. A 'chatter' between audience members can be distracting and irrelevant rather than productive and thought-provoking. Artworks which are not in the more interactive categories, and which demand sustained solo attention, should not be seen as being criticised by this research.

Again, as this is some of the first research in this particular subject area, it represents a tiny start to possible fields of knowledge. The scope for further research is almost unlimited, on a wide range of questions. Many more case studies need to be done to compare how representative these four Case Studies may be. As well as the more detailed suggestions for further research suggested earlier in this chapter, the potential for examining those interactive forms which are not gallery-based (such as telecommunications-based, or publicly sited artworks) is obvious. The experience and philosophies of interactive artists themselves is very valuable but currently only sparsely published (for example Hershman, 1993; Jenkins, 1994; Rokeby, 1995; Shaw, 1995; Weinbren, 1993). Some relevant post-graduate research in this field is currently underway but as yet unpublished (Susan Collins, Slade School of Art; Jonathan Jones-Morris, Middlesex University; and several artists at University of Wales College, Newport) but the subject still has plenty of scope for further research.

If hybrid and pragmatic research methods are also used for future research fields, interactive computer-based artworks can perhaps look forward to a more informed and successful future in gallery contexts.

Appendix I: Artworks referenced in the text

In alphabetical order by title of artwork.
For artists in *Serious Games*, please see also Appendix IV, the exhibition catalogue.
The 'references' include how the artwork was experienced by the author (at an exhibition, or on video for example).

Audio Zone: Susan Collins, 1994

See Section 6.1.

References
Seen at *V-Topia* exhibition, and on video.
Masterson (1994).

Bar Code Hotel: Perry Hoberman, 1995

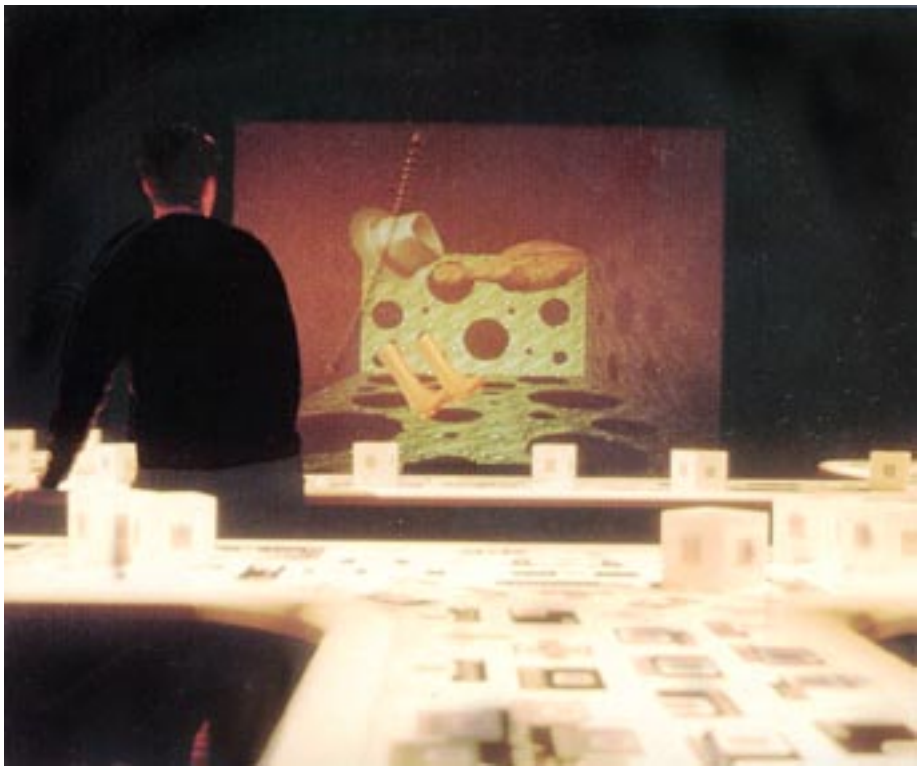


Figure 37: *Bar Code Hotel*; installation shot.

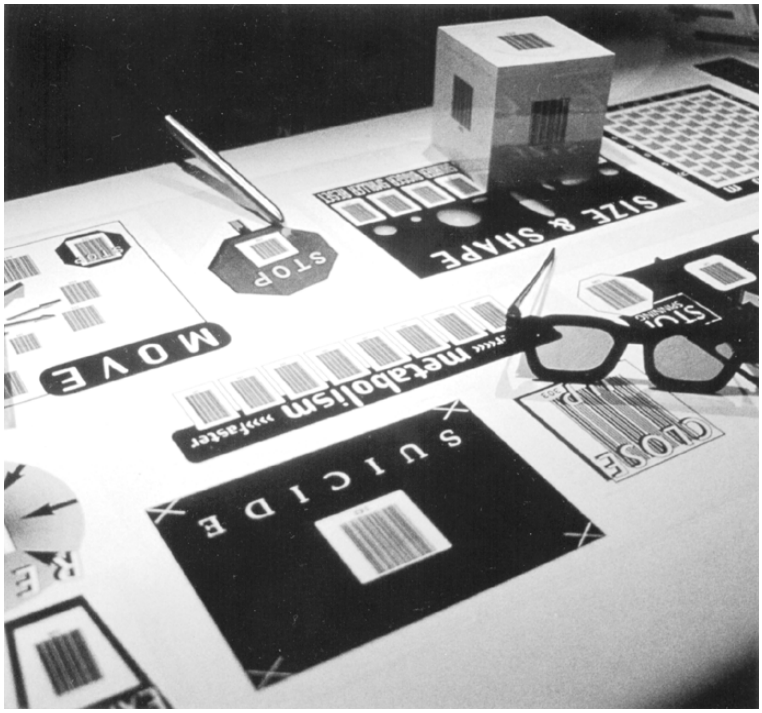


Figure 38: *Bar Code Hotel*; detail of bar codes.

Bar Code Hotel is a room is room installation with tables, and one large data projection (see Figs.). The tables and walls have labelled bar codes on them, and there are several bar-code reading pens in several parts of the room. Each area of bar codes controls a different object, such as a paper clip, glasses, or hat. Users can run a pen over the bar codes, and control the movements of their object (a 3D computer graphic) on the screen. However, other users' objects also appear on the same screen, so users can either get annoyed by the other objects, or try to co-operate in some way.

References:

Experienced a prototype at Banff Center for the Arts, 1993.
Hoberman (1995).
Art and Design no. 39: Art and Technology issue, 1995.

Hallucination: Jim Campbell, 1990

Viewers stand in front of a large (52 inch diagonal) television screen, and usually see themselves in the gallery (a small camera points at them). Sometimes their image will burst into flames. Sometimes there will a frozen image from some

seconds ago. Sometimes another person, a woman, who not in the real space, appears amongst the real people, sometimes she tosses a coin which determines whether you will be in flames or not. The more flames/people there are in the image the louder the flame sounds are. People can make different flaming shapes by combining their body shapes.

References

Seen on video and slide, and in *Serious Games* exhibition.

***Indigestion*: Diller + Scofidio, 1995**

Artists' statement:

> *Indigestion* is an interactive video installation that converges old and new genres (film noire, video games, video installation art, Exquisite Corpse structures) into an ironic mix.
>
> A fictional narrative involving two characters across a dinner table is projected in plan view onto a horizontal screen. The screen corresponds precisely in size and shape to the table itself and hovers at a conventional table height. Given the simulated spatial qualities of an actual dinner scene, a sensation of transgression is produced for viewers as they enter the installation.
>
> The script condenses an archetypal noiresque blackmail scenario into seven minutes. The crime is never revealed. The characters are of ambiguous relation and they are never seen; only their animate hands appear on screen — cutting, reaching, spearing, gesturing, fidgeting.
>
> Adjacent to the dining surface is a touch screen which offers the viewer/guest a menu from which to select characters, each a sexual and class stereotype: the high class masculine man, the low class masculine man, the high class masculine woman, the low class masculine woman, the high class feminine woman, the low class feminine woman, the high class effeminate man, and the low class effeminate man — each represented at the interface by a "modified" international male or female icon. The viewer is asked to choose two characters to activate the piece and then given the option to exchange one character at a time during the course of the meal. The replacement of a character triggers a branching pathway on the laser disk. The new character is introduced by a particular animation (from among 106 animations) in which the exiting character and his/her food are "sucked" away, the empty plate is loaded with the corresponding next meal, the new set of hands fall into place and the dialogue resumes... now with a new voice, grammar and vocabulary. The dialogue is conceived for continuity in any branching pattern, but as each new juxtaposition alters the event in accordance with the chosen stereotype, the content remains strikingly similar.

Indigestion uses technologies of "choice" to look at the theme of choice more broadly — the rhetoric of choice surrounding interactive technologies, individual choice in relation to the cultural construction of sexual and class distinctions. Choice is used as a lure to get the interactive viewer to confront the collapse of dualities such as masculine/feminine, high/low class, fact/fiction, freedom/control, and "real"/"virtual".

References

Illustrated lecture at ISEA 1995.

Video sent by artist.

Work in *Serious Games*.

***Mirror Images*: Richard Land, 1993-4**

See section 6.1

References

Experienced at *V-Topia*, Tramway, Glasgow 1994.

Cubitt (1994).

***NetEscape*: Ann Whitehurst, 1996**

Figure 39: *NetEscape*; installation shot at Laing Art Gallery

A room installation including a Web-based element on 2 computers, with painted net hangings, and three trails of large spots on the floor (and walls) each with an image or a challenging question from one of three 'personas' adopted by the artist. paper and pens were provided to leave responses in 'pockets' on some of the net curtains. Viewers could follow the trails on the floor and interact mentally, or leave notes, and/or interact on the computers. A web site presented six of the questions (for example: "What is the price to pay? Email the bill") with a space for responses. Ann replied to certain responses every few days, on the web site, and it was also possible to view all of the public responses. The gallery computers were not 'live' on the Web, but mutually updated with the public web site every few days. Some of the questions dealt with issues of disability, but most more generally dealt with your 'position' in relation to others.

References

Work in *Serious Games* exhibition.

***Osmose*: Char Davies and Team, 1994/1995**

(Osmose is produced by Softimage, by the team: Char Davies - concept and direction; Georges Mauro- graphics; John Harrison - VR software development; Rick Bidlack - music composition/programming; Dorota Blaszczak- sound design/ programming.)

An immersive computer-controlled environment which the user moves through, using 'virtual reality' type equipment. The user books a 20-minute appointment to be 'immersed' but other viewers can see a silhouette of the user in the helmet, and see a large video projection of that person's eye- view (in some cases this has been a stereo projection, viewed through 3D specs). Seats in the projection area have some optional stereo headphones also.

The 'immersant' is in a separate room with the attendant. They have the process explained to them by the attendant, and are put into a 'vest' which has a sensor which measures chest expansion, and sensors which note the direction of leaning of the upper torso. They wear a helmet which shows a 3D computer graphic image and has stereo headphones. They then start their 20-minute 'immersion'. They can move through a space which appears three-dimensional, and has 3D sound. The images are computer graphics of a 'landscape' of a tree, a clearing, a pond. The images are not naturally 'realistic' but are transparent and impressionistic. The user

can move through all spaces, including inside the tree with water molecules. Above the tree is a space with words in 3D planes, concerning quotes about perception and space. Below the soil is computer code. The user moves through the space by leaning the body, and by breathing in to go up, out to go down. The pace is calm and slow. After 20 minutes the 'landscape' automatically recedes and the user is in black space looking down on it.

Artist's statement:

> Osmose is a space for exploring the perceptual interplay of self and world, a site for facilitating awareness of one's own self as embodied consciousness in enveloping space. According to the philosopher Gaston Bachelard: *'By changing space, by leaving the space of one's usual sensibilities, one enters into communication with a space that is psychically innovating. For we do not change place, we change our Nature.'* Osmose is such a space.

References
Experienced at ISEA 95 in Montreal.
On video, and in *Serious Games* exhibition.
Davis (1996).

***Passage Sets*: Bill Seaman, 1995**

A 'poetry machine' where viewers can either watch or control navigation through a matrix of words. There is a triptych of three projected images, and the viewer can control the centre screen with a mouse on a podium. The left hand screen shows randomly generated 'poems' from the word sets, and the right hand screen shows video clips which are 'attached' to certain words or phrases.

The artist has created certain sets of words or phrases, in a certain order, and choosing any word from the sets can go together to make some kind of syntactic sense, (for example 'One pulls pivots at the tip of the tongue') The computer or the viewer can choose from within these sets, and have the video clips 'play' the poem. The central screen can either choose from words set in a pictorial 'landscape', or words as columns and rows which can slide over each other and be chosen by the user. There is also an option for the video to just play sets of words without having to choose.

The artist says about the work:

> "Passage" as text, "Passage" as travel, "Passage" as change over time, "Passage" as architecture. "Set" as pair, "Set" as illusionistic architecture, "Set" as device, "Set" as in mathematics... The work is drawn from architectural images shot in and around Tokyo, Japan and Karlsruhe, Germany contrasting the past and the present, focusing on travel, motion and light.

References

Experienced at ISEA 95 in Montreal.

On video and slide, and in *Serious Games* exhibition.

***Portrait One*: Luc Courchesne, 1993**

Portrait One is one of a series of artworks based on 'conversation'. *Portrait One* is a single screen interactive where the viewer interacts by touchscreen or mouse. A choice of three to five questions is offered to the user, which are addressed to the character represented by video clips of head and shoulders on screen. The character responds to the question/statement chosen, and then some more choices appear. Some of the questions are more straightforward like "where are you from", or "are you staring at me", and some more vague like "sometimes I dream". Some

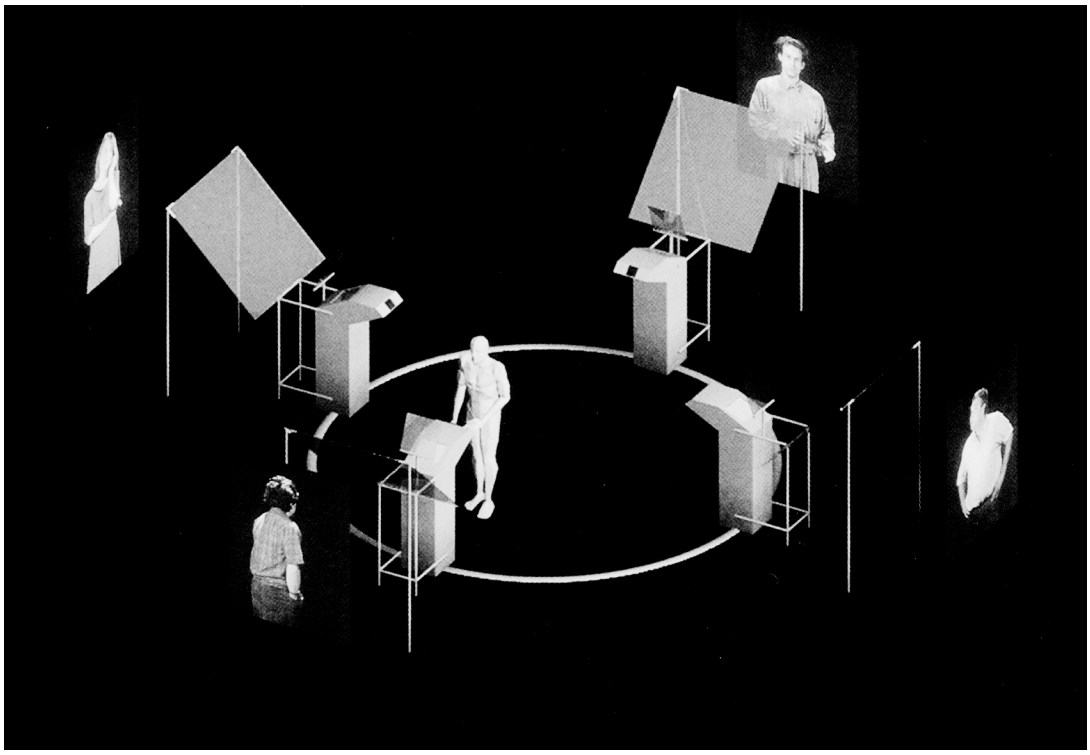


Figure 40: Courchesne; diagram of *The Salon of Shadows*, 1996

statements are more confrontational, and if a series of confrontational questions are chosen, the character responds, and eventually says goodbye. There are several different characters, including a young woman, a girl of about 12, a thirty something man, and an older woman.

In the subsequent artworks building on this work, *Family Portrait* arranges four screens in a square facing each other so that each character is in a different place. *The Salon of Shadows* 1996 is a similar square arrangement, but a more sophisticated arrangement, where the images are projected onto glass in a ghostly fashion, and the four characters can have 'conversations' with each other as well as with the users.

References

Portrait One was experienced at the ISEA 95 festival in Montreal.
All three works seen on video from artist.
Rubenstein (1994).

PullIt: **Joel Slayton, 1996**

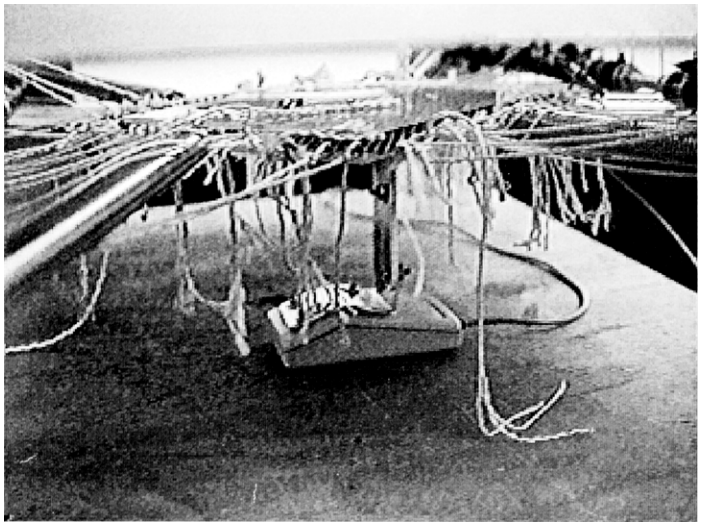


Figure 41: *PullIt*; detail of mouse with strings.

PullIt is a satirical work playing with issues of 'choice'.

Quote from the artist:

> "I just finished a rather simplistic audience interactive work myself called *PullIt*. There is a mechanical box with 64 strings entering it that are attached via a system of pulleys to a mouse. The audience handles the strings in a sort of force feedback manner to collective use the mouse to navigate a meta Web browser that compiles Quicktime VR environments dealing with shopping,

entertainment, news and porno. The output of the audience interaction with the visuals guides the navigation through each environment which is updated with sampled graphics from URL's from each category."

References

Material sent by artist.

Rehearsal of Memory: Graham Harwood, 1995

A single-screen interactive multimedia work also available as a CD. Viewers in a gallery view the work by clicking on different parts of the screen with a mouse on a podium.

Viewers can click on arrows which enable them to navigate across a large composite of body parts. Clicking on scars or mock tattoos on the body triggers different stories in text and voice, which are stories of residents in a high-security mental hospital.

Artist's statement:

> The aim of this piece was to work with a group of people from Ashworth Maximum Security Mental Hospital to produce an interactive programme embodying the life experience of those involved. This is manifested in the form of an anonymous computer personality made up of the collective experience of the group.

References

Experienced at *Video Positive* festival Liverpool 1995.

Seen on video and slide, and in *Serious Games* exhibition.

Resonance of 4: Toshio Iwai, 1994

[see section 8.1 for a fuller description]

Artist's statement:

> "This is an interactive audio-visual installation which allows four people can create one music in co-operation with each other. In this installation, four players are given different tones, they can compose their own melody each using mouse, putting dots on four grid images which are projected by video

projectors. I hope each player would try to listen other melodies which are being created by other players, then they would try to change their melody to make better harmony. This installation would not only make a resonance of sounds, but also would make a resonance of minds of the four players."

References

Experienced at *Video Positive* festival Liverpool 1995.

Seen on video and slide, and in *Serious Games* exhibition.

Brown, 1997.

***Silver to Silicon*: seven artworks plus overview, published as CD 1996**

***A Perfect Society* - Huw Davies & Arabella Plouviez. *RAMose* - Ros Hall. *Click and Point* - Annie Lovejoy. *The Batwa* - Terry Wright & Richard Haynes. *Media, Myth…and Mania* - Ship of Fools. *Externally Yours* - Michelle Henning & Maria Parkes. *Losing the Battle* - Kieran Lynos. The project directors were Frank Boyd, Andrew Dewdney and Martin Lister. Published by Artec.**

Figure 42: screen shot from *Media, Myth … and Mania*

See also section 6.1. A single screen interactive multimedia CD-ROM which is a compilation of seven artworks with an introduction and an overall navigation structure. The works deal with aspects of technology and digital photography, such as 'The Official Eye' section which includes *A Perfect Society* — a documentary

photography project on Durham Prison, and an informational section of prison surveillance using technology.

References

CD ROM published by Artec, London.

Sonata: Grahame Weinbren, 1991-93

See section 6.1

References

Experienced at Montage 93, Rochester USA, 1993, and *V-Topia*, Tramway, Glasgow (1994).
Cubitt (1994).
Weinbren (1993).

Zeromorphosis, Swans and Pigeons: Ritsuko Taho, 1996

A room-sized installation of wood/metal trolleys, with a few existing grass balls to start with. There is a 'making table', a video table with a playing tape by Taho, a dream writing table, a lower table for children/wheelchair users, and a hand-washing table. There are seven trolleys with metal frames and wooden tops (like

Figure 43: *Zeromorphosis*; installation shot of Laing Gallery.

domino pieces) and wooden shelves around the sides. Each trolley top has glass dishes on small platforms, arranged like domino spots.

People interact by making 'grass balls': On the 'making table', take a sheet of aluminium foil, and place a handful of potting compost and a handful of shredded banknotes on it, and mix with water into a ball, then roll the ball in the grass seed. Write a message concerning 'your dream' on the small (approx. 5x5 inches) duplicate pads. Fold the white copy and put it inside your grass ball. Wrap the ball in the foil, decorating/shaping the top as desired. Put the pink copy of the duplicate pad on the wall with blutack, put the grass ball on the shelves of the trolleys. After 5 days or so the balls sprout, and they are opened up at the top, and watered. The number of grass balls in various stages grows as the audience participates through time, and the pink notes on the walls also spread.

Before the exhibition, Taho does grass-ball making workshops with people involved in money (bank workers etc.) and videos their discussions and workplaces. In Newcastle she also interviewed market people about 'money' and videod the making of a grass ball. The tape of about 15 mins runs continuously, and contains both instruction and ideas.

The work concerns concepts of value. The artist says:

> " In the age of globalization of modernity, common patterns in the evolution of capitalism and industrialization exist regardless the geographical location and tradition. The hard core of similarities is economic. The economic system is based on competitive market value, money must be circulated to make more money.
>
> *Swans and Pigeons* is an attempt to reveal the voice of people who live in the reality of the serious game of modern society by allowing them to enter this arena through play. People in two cities of Newcastle and London are invited to express their "dream" in rather technologically domestic settings. Dream is interpreted as an aspiration, means of constructing an image for future, transforming something negative into positive and more imaginative. It is hoped that the project not only presents and reminds them of what modern society has eliminated from our lives, but also creates space and time for social interactions among people, stimulating their sense of humor."

References

A version was experienced at Capp St Gallery, San Francisco 1996.
Seen on slide, and in *Serious Games* exhibition.

Appendix II: Text of chapter on interactive and audience from the book *Fractal Dreams*

Playing with Yourself: Pleasure and Interactive Art.

I'm beginning to worry about our bouncing new baby art form of interactivity. I think it might be in danger of being smothered at birth by the weight of critical, pop-philosophical and academic attention being heaped upon it. By the time it actually reaches its audience, the artwork often appears to be too flimsy to support this weight.

Whilst a certain occurrence of childhood diseases might be expected from such a young art form, it is perhaps time for the artists and exhibitors to begin to face some responsibilities if the art is to have any kind of a healthy future. If interactive art is not to be doomed to a permanently marginalised freak-show alongside holography, then we have to start addressing more thoroughly the ways in which the audience relates to the art, and how audiences might get pleasure from it (or otherwise).

Bearing in mind that the discussions about artist-audience relationships for *all* of the visual arts tend to progress under fierce debate, there are nevertheless still reasons why the debate for interactive art is a particularly interesting, and particularly difficult one: For a start, often we quite literally don't know what we're talking about. Because very few accomplished interactive artworks are touring or cheaply available, our primary experience of them is truly a 'virtual' one — that of reading second hand descriptions or reviews. Whether the reviewers choose to maul or drool over them, either way the artworks reach us thoroughly dampened by the mouths of others. The particular nature of interactivity makes this a more than usually serious problem: as Robert Coover asks about hypertext[1] works, "How does one judge, analyse, write about a work that never reads the same way twice?"[2] Whilst every good post-modernist knows that even a single, non-interactive photograph never reads the same way twice, the advent of interactivity has doubly exploded concepts of objectivity.

Whilst forcing critics to publicly acknowledge their subjectivity might be a useful by-product of interactive art, there is still a need for many more interactive artworks to be seen and thoroughly road-tested by 'real' audiences rather than virtual ones. At the risk of adding yet another blanket to the burden of critical attention (whilst acknowledging my views to be unashamedly anecdotal rather than scientific), it seems like a good time to look at the peculiar pleasures of interactive art, how the relationship between artist and audience is changed, and how this may affect the very structure of the exhibition form. Are you having fun yet?

Joystick Aesthetics. What kind of fun are we having?

A primary question for those looking at interactive art is based upon a certain confusion about what kind of pleasures to relate this experience to: What *kind* of fun are we supposed to be having? Video pleasures? Installation pleasures? Cinema pleasures? Kinetic sculpture? Home computer? Game arcade? Happening? Picture Gallery?

In many ways interactive art is "the boundary-subject that theorist Gloria Anzaldúa calls the *Mestiza*, one who lives in the borderlands and is only partially recognised

by each abutting society."[3] Re-reading the critical theory of some abutting artforms such as video art however, makes it clear that our bouncing baby art form is not of course sprung fully formed from Silicon Valley, but has many parent artforms claiming it, from Dada and kinetic art to video and community art, each bringing its' own aesthetic values to bear.

The aesthetics of interactive art using computers is a difficult area to deal with critically at this stage of development; images on a computer screen still tend to look like, well, 'computer images'. Computer terminals themselves are still so loaded with cultural meanings of work, commerce etc., that it is difficult to override those meanings in order to see any content in what may be on the screen. In 1987 Vivian Sobchack characterised the computer screen in relation to cinematic space as "spatially decentered, weakly temporalized and quasi-disembodied"[4], a character which must be critically addressed when thinking of the audience's first reactions. Just as video installation artists have struggled with ways of using the video screen which attempt to override the inherent reading of the object as a banal 'television', interactive computer artists have struggled with the problem of seducing the viewer close enough to those pale, grey, square boxes to be able to commune with the content on the screen (and once there, to engage the viewer sufficiently for them to want to explore the work). Lucia Grossberger for example, is an artist who was born in Bolivia, and who brings a range of sculptural and installation skills to her works using interactive technology. Her work '*A Mí Abuelita*' involves a series of Bolivian-style altars with sculpted items such as ceramic mummies, beer and religious imagery. The central image in each of the altars however is a computer screen, where the viewer can interact with HyperCard stories of the death of her great aunt, or screens which superimpose a video image of the viewer with 'day-of-the-dead' skull images. Although the content of the work concerns religion and death, the sculptural and textural qualities make the sites of interaction very approachable — much more so than a naked computer terminal.

When considering the aesthetic qualities of the screen-based images themselves, the choices now range from the high definition to the deliberately coarsely pixellated. The extent to which the style of images and graphics is affected by mass-produced image-manipulation software is an interesting question — certainly, I'm beginning to recognise when certain Photoshop 'filters' or Video Toaster effects have been used, not to mention the different styles of interaction which go with Director or Authorware software packages. To a large extent, artists who do not have access to the vast resources of tailor-made software, find themselves working within someone else's benchmarks of style, or else tinkering with its peripheries.

Whilst images on a screen/monitor or video projection are not of course the only options for interactive artists, they are still the major options, and artists are still experimenting with their particular qualities of colour and space. One of the few pieces I have seen which managed to absorb me in a primarily visual pleasure is a part in Beverley Reiser's *Temple of the Goddesses*.[5] It is a piece where you as the viewer appear on a video projection to be moving within her graphics, and at one stage words and images of fire 'stick' to your hands and follow your movements. Although coarsely pixellated, the gestural graphics and rich, glowing colours managed to create an evocative and luminous space in which to juggle with fire (and other ideas). Given time, perhaps the 'pixellated aesthetic' may take on a quality of its own, and a reading beyond that of simply 'computer'.

Because of the newness of interactive art using computers, most of us will no doubt remain unsure of what kind of pleasures to expect from it, for some time into the future. Because of this fact, some of us are also destined to be disappointed if the work doesn't talk to our particular pleasures. If you are expecting pictorial pleasures then those images should be beautiful, if you are expecting televisual pleasures then the artwork has to override the other ambient stimuli, if you are expecting sculptural pleasures then the texture and installation are vital. On the other hand if you are expecting video-game pleasure then maybe you actually *want* your pleasures to be "spatially decentered, weakly temporalized and quasi-disembodied".

The advent of the video-game is just one of the recent cultural developments which have made some theorists question whether or not 'pleasure' within visual culture is in danger of being supplanted by 'fun'. It almost comes as a shock that Susan Sontag should have to point out so carefully that an aim of culture is: "... to produce food for the mind, for the senses, for the heart. To keep the language alive. To keep alive the idea of seriousness. You have to be a member of a capitalist society in the late 20th century to understand that seriousness itself could be in question."[6]

This confusion of pleasures is certainly beginning to be addressed seriously: as Peter Lunenfeld says: "To develop a strategy to theorize the products of the technoculture, we must draw from the traditions of aesthetic philosophy without holding computer-inflected media to a static and anachronistic set of 'standards' — hybrid media require hybrid analysis."[7] Lunenfeld also helpfully suggests a basic bifurcation of types of interactive art pleasure: the "immersion" in the safe fakery of virtual reality versus the "extraction" of narratives and information from hypertext.

The key pleasures of interactive art, including those of immersion and extraction, are of course not necessarily purely aesthetic or pictorial ones, but, unsurprisingly, the pleasures of interaction itself: As Alluquère Rosanne Stone argues in respect of Sobchack's "spatially decentered" criticism of the computer screen, "This seems to be true, as long as the mode of engagement remains that of spectator. But it is the quality of direct physical and kinaesthetic engagement, the enrolling of hapticity in the service of both drama and the dramatic, which is not part of the cinematic mode."[8] These qualities of direct engagement however differ greatly from artwork to artwork, for despite the hype of interactivity as a democratic wonder, there is a great disparity in the extent and quality of this engagement.

How interactive?

> "The current romance of interactivity promises such things as being a better or more democratic art form and/or the art form of the future. ... Yet interactive videodisks do not empower the viewer to create a wholly new work with the materials they are given, and they only appear to eliminate the alienation of the artist and viewer present in most avant-garde art." Ann-Sargent Wooster[9]

As Ann-Sargent Wooster goes on to point out, there is an existing history of 'happenings' and performance art in which the interaction of the audience was of primary importance. The kinds of interaction ranged from the "pseudo participation" of plants in the audience, through token involvement, to "pieces in which there were only participants-performers and accidental spectators"[10]. In

many of these however, the relationship between the artists and the audience was often a confrontational one; challenging, tricking or simply frightening the bourgeoisie. Now that the prevailing views of the relationship between the artist and the audience are (perhaps!) different, it is the 'democratic' possibilities of interactivity which have been receiving the most attention — the ways in which there can be physical input and participation by the audience. However, there are very many ways of interacting, and "pseudo participation" or token participation still seem to be present amongst those ways. Interactive novelist Thomas Disch's experience of hypertext is that "As long as readers cannot add new words to the story and change it, ... the creativity of interactivity fiction lies solely with the author."[11] Obviously though, there is a continuum of tactics which allow more or less input from the viewer/participant, including the ultimate in 'audience input' — the ongoing freeform contributions to electronic bulletin board systems, or networking events, which have no director or controller but many 'equal' participants who are equally their own audience.[12]

Art pieces such as Abbe Don's *Share With Me a Story*[13] are sited at the more 'democratic', participative end of the visual spectrum: It is usually shown alongside her *We Make Memories* which is a HyperCard telling, with family snaps, of four generations of Jewish women in her family. Viewers can get ideas from interacting with that piece, and then, importantly, *Share With Me a Story* enables them to scan in their own snaps and record their own story as a growing interactive archive. In her more recent piece *T.P.T.V.* Don turned a 'photo-booth' into an interactive ideas terminal, where people could see artists' work, record a moving image of their face with their opinions on specific issues and works, and interact with previous peoples' comments.

Not all artists choose such tactics however, and concentrate instead on ways of viewing rather than ways of contributing: Grahame Weinbren is keen to differentiate his 'interactive cinema' from the run of the mill 'point and click': "In developing an interactive cinema, one of my primary concerns has been to retain the articulation of time. Without it, we quickly descend into the pit of so-called 'multi-media', with its scenes of unpleasant 'buttons', 'hot-spots' and 'menus', and the viewer is forced into a path-following, choice-making state of mind. 'Multi-media' leaves no room for the possibility of loss of self, of desire in relation to the unfolding on-screen drama."[14] Weinbren's screen in the piece *Sonata* is "continuously responsive" to touch, but maintains an "articulation of time", so that the viewer is nudging and changing viewpoint rather than pointing and choosing different subjects.

Interaction is of course not a factor bounded by technology: In Gary Hill's *Tall Ships*[15] piece for example, the technical interaction is very passive and simple: video clips of single figures approaching are triggered by the viewer's body moving along a darkened corridor. There is no choice or physical input from the viewer, but nevertheless, the 'emotional interaction' created is very strong, and because of the very simplicity of it all, the viewer must 'input' a lot of their own ideas.

Such hybridity of media and tactics means that each 'interactive' piece has to be judged individually on its degree of interactivity. However, there are some *particular* pleasures of interactivity which tend to be common across the range of works, from point-and-click to virtual reality.

Intimate Exchanges, Household Words

> "Our connection to the real world is very thin, and our connection with the artificial world is going to be more intimate and satisfying than anything that's come before." Marvin Minsky, Toshiba Professor of Arts and Sciences at MIT.[16]
>
> I'm in a crowded shopping mall gallery, and Pedro Meyer is talking quietly into my ear. He has a rich voice, and speaks thoughtfully and slowly in my headphones as he shows me photographs about the death of his parents. Although people are milling around me, I find myself absorbed, oblivious, and moved to the point of tears by this ... computer.

Even simple interactive CD-ROMs like Pedro Meyer's *I Photograph to Remember*[17] are capable of an almost shocking amount of intimacy. Whilst one might have to be a Toshiba Professor to actually find it "more satisfying", it is certainly more comfortable than, for instance, dealing with the real mortality of one's own parents. Not that this is any very new reason for moral panic; artists have been dealing in distanced and vicarious emotional life as a popular recreation since before Charles Dickens' serialisations in *Household Words*, and many a relationship now takes place over the virtual voice of the telephone. As Wooster comments, "the current call for interactivity on the part of video artists is part of a larger societal development of machine-augmented simulacra of intimacy."[18]

The physical situation of sitting close to a monitor designed for one person, wearing headphones, controlling the images which fill your field of vision, is an intense one. The performers are performing for you alone, you are in control of something bigger than yourself, but you are not responsible — the advantages of being a child, but without powerlessness. We are highly engaged and involved, and yet 'safe', because we know we can switch it all off. Whether you are sitting in this computer cocoon, or participating in coach-potato quiz games on your future interactive TV, the 'comfort factor' of interactivity is very high, there to be exploited by advertisers and artists alike. However, whilst the pleasure of intimacy (even if it is a "simulacra of intimacy") may be a deeply engaging tool for the artist, it has counterpoints which could have serious effects on how that artwork may be able to be viewed.

Intimate Exchanges ... Selfish Pleasures?

> I'm inside of Gary Hill's *Tall Ships* piece at last. I've been looking forward to this, having had it described to me by several curators and reviewers: "moving" they said, and "haunting". Actually, I'm currently more absorbed by the fact that the man behind seems to be standing closer to me than is strictly necessary in the darkened corridor. There's also someone in front of me talking very loudly at his girlfriend, in piercing Oxford accents. I can't tell whether Gary Hill's video figures are approaching *me*, or are just a little late to greet the previous viewers. Or maybe this isn't interactive at all? If only those other people would drop dead, then maybe I could tell. The piece may have brought tears to reviewers' eyes, but they (mutter grumble mutter) presumably had the luxury of private views (mutter grumble mutter). Sitting on the train later, I'm a little shamefaced. Even squeezing around the populous Pre-Raphaelite

painting exhibition, I hadn't actually wished the other audience members wiped off the face of the earth.

I'm sitting in front of my computer, doing nothing in particular, when a colleague wanders over and makes a movement towards my keyboard. As an instant reaction, I grab his wrist, hard enough to make us both yelp in surprise. I would be happy to lend my camera to anyone of reasonably sound mind, so why do I start behaving like a dog over Meaty Chunks when it comes to my computer?

The powerful force of intimacy has a very important flip side for the exhibited forms of interactive art. Such intimacy is difficult to interrupt, share, or even gaze upon. The structure of much interactive technology is essentially one-to-one, and even when the physical structures allow for more than one person to view at a time, the members of the audience are often somehow *in competition* with each other, or at least confuse the reading and impact of the piece for the other viewers.

Are the primary pleasures of interactive art therefore necessarily *selfish pleasures* — more exclusive, more individualistic than viewing other visual arts? Those pleasures of choice which enable the viewer to choose paths, to go at their own pace, make it annoying or incomprehensible to anyone 'watching over their shoulder', and intensely irritating to have one's shoulder watched over. Does it change 'gentle readers' into snarling curs? The lonely pleasures of viewing interactive art could be seen as part of the increasing 'privatisation' of the body since the fifteen century, when "In particular, the subject, as did the body, ceased to constitute itself as public spectacle, and instead fled from the public sphere and constituted itself in text — such as Samuel Pepys' diary"[19]

The theorist Frances Barker characterises such a privatised body as "raging, solitary, productive"[20]. For the current circumstances, we could perhaps add "consuming", for ideally we wish to buy and take home these pieces of art, to explore at our own leisure, uninterrupted. Compact discs, those glistening rainbow objects of desire, have never promised so much as their potential for intimate, headphone-cocooned, *personal* computer, private experience. The fact that a key area for commercial investment in interactive CD development is currently pornography, should come as very little surprise.[21]

Some theorists would go so far as to describe the privatised nature of the interactive viewer as also being inherently narcissistic: Rosalind Krauss in her article 'Video: The Aesthetics of Narcissism' described the structure of many video installations as self-referential to the body of the performer/artists: "The body is therefore as it were centred between two machines that are like the opening and closing of a parenthesis. The first of these is a camera; the second is the monitor, which reflects the performer's image with the immediacy of a mirror."[22] In thinking about interactive works such as Beverly Reiser's, where the viewer appears on screen as animateur, for Krauss' "body" we could perhaps read "viewer". Even if the viewer does not actually appear on screen, the machines obediently and immediately reflects their choices and actions, amplified and decorated. The pleasure comes from seeing the stamp of the viewer's self upon the artwork. Some artists of course are aware of this nature, and use it within their work: '*Rigid Waves-Liquid Views*'[23] for example, which created a reflecting 'pool' that rippled when the user touched

its screen, is described by Peter Lunenfeld as "creating a model of VR fully aware not only of its onieric but also its narcissistic underpinnings."[24]

Narcissistic? Lonely pleasures? The fact that as a viewer of interactive art you are often effectively *playing with yourself* is simultaneously interesting, pleasurable and slightly worrying. The fact that when the artworks are displayed, you might be playing with yourself *in public*, makes these relationships even more complex.

Public Intimacy

> I'm at an exhibition in Rochester, New York, one of four people standing in line to see Lynn Hershman's interactive piece *A Room of One's Own*. As it is a black box a foot or two square, on a pedestal, with an eye hole, the only indications of the content are the reactions of the current viewer, so we all watch that person intently, for want of anything more interesting to do. Most of the men look slightly embarrassed as they walk away. When it comes to my turn I bend down to peek in the peephole, and become aware that the piece is about voyeurism and privacy and gender. The video clips in this miniature 'woman's room' are actually being triggered by my eye movements, and I can see in part of the room my huge eyeball looking back at me. At the same time I'm also aware that I'm standing with my bum in the air in the middle of a public space, and that people are probably looking at me, especially those in the queue. As I leave the box, I hang around for a while to further study the reactions of the queuers and viewers, and realise that other people have done this too. Thus Hershman's small black box has become only the nexus of a room-size dynamic of voyeurism, in which awareness of your own body is inescapable.

The last centuries' 'privatisation' of the body, reflected in some modes of new technology interaction, is ironically turned on its head by presenting the pieces in the exhibition form. Although locked into an intimate experience, *the player/viewer also becomes a spectacle*. Especially when wearing VR helmets, the effect is rather like playing 'blind man's buff' and one's enjoyment of the experience rather tends to depends on one's level of trust in those who are surrounding, but invisible. The young and confident tend to have few problems with playing this game; those who have experienced the gaze as weapon tend to have problems with the idea of being an object as well as an audience.

As well as Lynn Hershman, there are other artists who are very aware of the complex position of the viewer as spectacle as well as spectator, and use this to add dimensions to their work. American artist Sharon Grace[25] for example, in her installation *Inversion*, ensures that viewers are very much aware of their own presence: In a bare, office-type room, you sit at a desk which has only a telephone on it. If you answer its ring, then a video screen in the wall illuminates to show you the back view of a reclining female nude like a 'Vanitas' painting, only instead of holding a mirror, she holds a telephone handset, and looks at a live video image of your face, for you are being recorded by a hidden camera. She never turns towards you, but her telephone voice talks of how she longs to meet, how she wants to be remembered over this distance, and how she misses the world. The piece was first shown at *Cyberthon*, a twenty-four-hour-long virtual reality gig held at the studios of Colossal Pictures, in San Francisco in 1990. Timothy Leary was there, as was Brian Eno, William Gibson, and several hundred male adolescents who might have been

wearing anoraks if it hadn't been California. Anticipating the preponderantly male audience, Grace set out in part to address the sad alienation, and the repressed physicality of 'computer nerds', not to mention challenging the voyeurism of art and technology. The feedback she got was dramatic: male viewers had to be helped out weeping, and William Gibson was quoted as saying that the experience made him "as vulnerable as I had ever felt in art".[26] This use of challenging and addressing that unfortunate 'body' which technology tries to forget, is an important factor if interactive art is to maintain any depth of relationship with its audience.

As well as artists who address the physical presence of the audience, there are also artists who make conscious use of interaction *between* members of the audience: The works of Sonya Rapoport for example tend to use "deconstructive play" and a variety of physical interactions (as well as electronic) to involve her audience. In *Shoe Field*[27] for example the participant has to remove their shoes and input their information into a computer rather like a corny automatic fortune-telling machine, in order to receive their highly technical-looking shoe character profile. This tells the participant to place their shoes on a particular tile laid out on the floor like a giant board game, get a Polaroid taken, and then further interact with the 'shoe-personalities' of previous players. The piece is designed for several participants at once, and shuffling around with plastic bags on one's feet seems to have produced a sufficiently sociable atmosphere to enable the reviewer from *High Performance* magazine to go home with a date (Rapoport has also produced more recent pieces concerning sexual jealousy).

Perry Hoberman's 1993 *Bar-Code Hotel*[28] is even more dependent on interaction between members of the audience for its full effect. Participants 'work' the piece by running light pens over bar-codes stuck to a table on which real objects are arranged: Run your pen over the bar code next to a bust of Elvis Presley, and a 3-D graphic of the bust appears on a big video projection screen. Run your pen over the bar codes marked 'rotate' 'fast' 'slow', 'bigger' etc. and you can produce your own animation. There are however several tables and several light pens attached to the same screen, so you either get very annoyed with the other participants, or work out some way of communicating with them in order to create joint effects or stories. Thus Elvis can suddenly appear wearing a pair of graphic glasses from another table, but only if you can manage to co-ordinate the right size and position. It's fun to watch as well as participate, and so becomes some kind of social event which is actually better with more people, rather than being devalued by their collective presence.

There are obviously many more ways than tapping on a keyboard for interactive art to meet its singular or collective public. All this talk of 'viewers', 'participants', 'players', or 'audience' however, seems to have skipped a fairly important point: Do we know more or less who these people might be, and how they look at art?

Who do they think they're talking to?

> "In Montreal, *Videotron* allows home television viewers to install, for a slight fee, a small computer that tracks choices and then discerns the viewer's age, sex, and socio-economic status and programs commercials that are personality-coded. For instance, a white woman in her forties would get different program

> choices (and commercials) than a teenage African-American." Lynn Hershman[29]
>
> I'm at a new technology trade fair in New York state, watching people play on a virtual reality game which combines the wearing of a VR helmet with being strapped into a gimbals-like circular cage which tilts the victim every which way up. People are queuing for up to three hours for a go, and can watch what the players are seeing, on a video screen (the usual 'shoot 'em up' scenario). As people stumble off the ride, I ask a handful of people of each gender the same two questions: "What did it feel like?" and "Was it *you* in there?". Although hardly scientific, there is a marked difference in the responses: the men talk mostly about being 'out of body' and the women talk mostly of disorientation and discomfort. In answer to the second question, *all* of the men say "How do you mean?" and *all* the women laugh and say "Nooo".

"What is your target audience for this piece of work?" — that's the question which always make my students groan and wriggle uncomfortably. Not that I blame them, for it's a very difficult question. The current theory is that artists and funding bodies are terribly concerned about knowing who their particular audiences might be, but in fact the practice is that the arts, unlike advertising companies, are not very well-informed about exactly who they're talking to. The debate about audience is an ongoing one for all visual arts, but interactivity has some particular problems of its own.

One of the grand claims for interactive art was that it would have a broader possibility for pleasing different audiences, because people could, like browsers in a supermarket, choose paths within the artworks to suit their particular tastes; As Norman M. Klein says in 'Audience Culture and The Video Screen' — "The 'creative' consumer invents his or her own community. Instead of painting by number, the viewer buys in by menu."[30] However, rather than letting interactive art off the hook of 'the audience problem' it seems that interactivity needs to be even more careful in this area than other artforms: Different individuals have always, of course, read the visual arts in very different ways, but if the art uses interactive technology, then different people seem to have a very different way of approaching, experiencing and *using* the technology, as well as reading its content (take, for example, the different reactions of men and women to the virtual reality game).

Although it isn't usually terribly useful to directly apply the ways in which advertising market research categorises its audiences to the art world, the fact that the existing market for commercially-produced interactive computer products is preponderantly male and adolescent, is an interesting pre-existing condition for those seeking to define audiences and use. Even assuming that the artist has a 'narrowcasting' rather than a 'broadcasting' aim however, there is still the danger of stereotyping the perceptions of that particular target group.

The Small Body Part

> "Forgetting about the body is an old Cartesian trick, one that has unpleasant consequences for those bodies whose speech is silenced by the act of our

> forgetting; that is to say, those upon whose labor the act of forgetting the body is founded — usually women and minorities"[31]

The issue of 'the body' is a seminal one for computer interactivity, and one which is under hot debate by many contemporary writers.[32] Within the complex debates, many suggestions have been made that the male-gendered experiences of the technology tend to differ from the female, and that the reasons lie deep in psychology. Some say that the desire for 'immersion' in VR is to do with virtual space being female, some say the popularity of video-games with certain groups is because of desiring "freedom from the sense of loss of control that accompanies adolescent male embodiment."[33]

Whatever the reasons, the fact that the disembodied nature of computer-based "simulacra of intimacy" is available, has led to a rash of tales (some apocryphal) of "computer crossdressing". The majority of tales are of men adopting a female persona, such as the male psychiatrist who interacted for many months with women, through postings on a computer bulletin board system under the persona of 'Julie', an older disabled woman.[34]

This short excursion into the subject of 'the body' is really an adjunct to my musings on audience, in order to warn that even if artists think they have a good idea of how to define their audience, that may not be how the audience chooses to define (or redefine) itself.

Virtually There
(In which our heroine rounds up pleasures in cyberspace.)

> I'm sitting in a sunny and tiny flat, as Pat and Jocelyn show me their interactive work in progress — a computer-based telling of their experience of being stranded for several days by a blizzard whilst backpacking in the Californian Sierras. As they talk me through the unfinished sections, they laugh, interrupt each other, and give me different versions of the same event, swapping hiking anecdotes with me and scratching their Poison Ivy rash from yesterday's walk. They've done a thousand different things in their lives, from bookbinding and textiles to American Sign Language and the study of wolf behaviour. Their interactive work manages to combine many of these pleasures, as well as reflecting their many-branching characters. Pat's design company has produced interactive CD-ROMs in collaboration with other artists from various disciplines, and the company is called, she tells me, Convivial Design.[35]

Despite the fact that mass-produced software is such a strong aesthetic and structural controller of much interactive art, the medium can nevertheless still show the marks of the personality of the artist. Hence retentive boffins with few social skills are highly unlikely to produce a piece of work which is bursting with conviviality and the talent to engage a general audience.

It's hardly a new or profound comment to say that the interest of an artwork lies in its content, but the inherent pleasures of interactivity have tended to mask this salient point. The pleasures of 'extracting' ideas and information from an interactive CD-ROM, the pleasures of exploring the illusion of a virtual environment, the pleasures of having an environment respond to you, are all such

strong medicine that we are willing to forgive a lot. Even those CD's that are so badly constructed as to be plodding, frustrating, confusing, predictable or simply dull, can at least keep me pushing buttons out of curiosity, or fear that I might miss something. Those pleasures of 'choice' can even start to dull the political acuity: Seeing the CD-ROM *From Alice to Ocean*[36] for the first time, a long time ago, I was highly amused by the part where, as a subtext, you see a small picture of the woman who travelled by camel across Australia, and a small picture of the photographer who recorded the trip; click on him and he waffles on about light and atmosphere, click on her and she moans about what an immature pain he was, always getting in way by taking photos. Great, I thought, this is polyphony, no more linear logic. You also get two different political views about Aboriginal Australians ... but what you don't get, of course, is the Aboriginal Australians' own viewpoints. The fact that you're getting two different kinds of white bread doesn't mean that you're getting any real choice, but it makes you *feel* as though you are. Our pleasures of choice are still small options within narrow boundaries: The means of production and distribution are still (surprise surprise) in the hands of the military or big business, and the artists getting access to the means are still predominantly white, and male.

Perhaps a primary pleasure of interactivity is that of *control*, which is why the thwarting of audience control, or the realisation of 'token' control, is a site of such *dis*pleasure. But if audiences get pleasure from control, then so do the artists, and the delicate balance between the two is surely one of the key skills of interactive art. All too often, having control of shiny new technology seems to inspire certain artists to huge abstract concepts which encompass god-like ranges of history, space, art, science and religiosity (sort of a 'Renaissance Man with a hard-drive' kick). Certainly, new interactive technology is capable of being very 'impressive' (as long the audience is willing to "take no notice of him behind the curtain"), but what then? The skills needed by artists if they are to truly loosen control over the audience, but still share their pleasure, are perhaps less like traditional art skills, and more like the social interaction skills of "throwing a good party", or of enabling/community art. The pleasures of control for the audience also have to achieve a delicate balance within the work, in counterweight to those pleasures which need an absence of control: the pleasures of surprise, suspense, or chance. Exhibited works of the CD-ROM variety are often too concerned with plodding down pathways rather than letting imaginations branch. Often they provide much too much information and images, just because they can.

We should perhaps remember that ultimately, the audience's final pleasure, is in choosing *not* to interact, in total denial of the author's power. If passivity didn't have its own particular pleasures, then presumably television would have died out by now. There are times in life when you don't want to have to choose options, or input your own thoughts; indeed there are times when you might be bored to tears by your own ideas, and would much rather just receive somebody else's creativity.

So What Might This Mean for the Exhibition Form?

> "Once having discovered the touch screen, the dilemma faced by the viewer/participant is whether to keep making selections or to move toward the centre of the space in order to fully comprehend the results of his/her

interventions. This, in effect, frees up the touch screen for others to participate in the selection process." Peter d'Agostino *Double You (and X, Y, Z)* 1981-86.[37]

I'm sitting in the chair in front of the screen of Grahame Weinbren's *Sonata*,[38] trying to get into its subtle and wandering structure. There's a 'corral' around my chair, with stretched nylon filaments on a frame, like I'm inside an aviary. My screen is connected to a tower with some monitors which face outwards, so that the people outside the aviary can see them ... but the people standing waiting for a turn aren't looking at those monitors, they're looking at *me*. And some of these people of are tapping their feet. And drumming their fingers. And sighing, heavily. When a small child begins to turn from querulous to definite whine, I give up the effort and slink out apologetically. Some months later, the American curator of that show is at a conference, denouncing the fact that an arts reviewer had refused to look at Weinbren's piece because she "didn't have time for that". It seemed churlish to admit that the bashfulness of Brits may be a less contentious reason why the longer and slower interactive arts don't get a full viewing.

The particularities of the pleasures and dynamics of interactive art mean that certain problems arise when trying to view some of them in an exhibition form. Queues happen, some pieces are bypassed, some leave the audience's role unclear, some are paced too slow, some are too intimate to survive a group, some are read only on the first, surface level because of the lack of time to peruse, and (very, very often) they break down.

Assuming that the petulant technology can be cured, there still seems to be a need to rethink the exhibition form for interactive art, and examine carefully its audience dynamics. After all, interactivity has perhaps even more to lose than other visual arts: Any analysis of how interactive art is looked at relates interestingly to an eternal problem for art in general — do the images visually communicate what it is that is expected of the audience? With a painting or an installation, the audience may move on having metaphorically 'failed to see the point' of the artwork. However, with interactive art which demands a response of the audience (an approach towards the active sensors, or a sitting down at a terminal, or a triggered moving through a series of images) this becomes a more practical question: If the image at the first point of contact fails to communicate, then the audience may move on having *literally* 'failed to see' the rest of the work. Whilst viewers rarely walk out of cinema presentations, the gallery has a context of 'the two-second glance', and the pleasures must be strong ones to keep the viewer long enough to see an extended piece of work.

Artists like Hershman and d'Agostino have obviously thought very carefully about designing their pieces to work with an existing gallery audience dynamic, but what of possible 'new' forms of disseminating the work, which interactivity might create or expand? At this stage, it is indubitably foolish to try and prophecy exactly what will happen to the public face of interactive art. The prophets of the 'camcorder revolution' were certainly quite definite about the utopian future of that medium, which in reality has ended up splattered messily somewhere between Jeremy Beadle[39] and Rodney King. Like video art however, the means of seeing interactive art may end up straddled over various tactics, from exhibition (sitting on hard chairs in galleries) and product distribution (buying CDs or renting from alternative distributors), to transmission (somewhere on the margins of interactive

TV or other networks). The particular means of reception for the artwork therefore depends very much on what you mean by interactive art: If you are talking about involved CD-ROMs then really the exhibition form can only act as a 'trailer', for ideally you buy those objects of desire to take home, and satisfy yourself in private. If you are talking about 'networking' art events, from humble computer bulletin boards to live international video link-ups[40] then, although indubitably interesting to the direct participants, 'outsiders' (those with no direct physical or metal access to it) can only have a rather devalued relationship to the events. Like 'fax art' the networking genre currently seems to proceed in some kind of permanent 'underground', with very little focus or documentation. If you are talking however about a virtual reality variety of interactivity, then the structures of theme park, video game, and timed, paid-for audience interaction seem to be the dominating context.

If we are alternatively talking about adapting the traditional 'art gallery' means of presentation (for a range of different genres of interactivity), then perhaps the structure of the walls and spaces may change. Perhaps splitting into 'brothel-like' private booths? Perhaps with audience access through tickets purchased by the hour? Indeed, perhaps some varieties of the artform might change the gallery in ways which are highly ambivalent: "If interactive art simply mirrors the game — its themes and values — it becomes symptomatic of uncritical post modernism where there is no difference between entertainment and art, where consumerism reigns. And when, loaded down as amusement, it knocks on the museum door, it insists on altering how and why museums function, further institutionalizing art as consumer fun."[41] Those 'selfish pleasures' of computer interactivity may indeed turn out to have a long-term affect on the commodification of artworks.

Although the spectre of populist or simplistic button-pressing is indeed a serious one, and although those enthralled by new technology have a tendency to dismiss the earthbound lessons of the past, some answers to the difficulties of audience relationships may in fact be found in closer attention to the experience of municipal galleries, or 'discovery museums' with their lower-tech interactions.[42] In support of lessons of the past (and in praise of older artists), it is also no coincidence that the artists who produce some of the most successful interactive work are those such as Lynn Hershman, who have a long history of relevant work in video and performance, and who have spent years of applied hard work on the tender dynamics of interaction. Neither is it a coincidence that the artists producing some of the most effective virtual reality art are those including Brenda Laurel, and Toni Dove & Michael MacKenzie[43], who come to the field with a strong theatrical background, catholic interests and, very importantly, plenty of evolved social skills. Artists such as Bill Viola have been wrestling for much of their lives with the problems inherent in video installation, to get to a point where the medium has the power to seriously move and enthrall; it is a little soon perhaps to expect as much from our bouncing baby interactivity, and certainly too soon to discard the experience of the past. As Regina Cornwell emphasises "These explorations are crucial to how the world can be re drawn and viewed in an art whose power is in its open-endedness and its polyphony. And for the participant, too, the interactive installation is hard work. To be meaningfully experienced, it demands time and serious attention."[44]

Beryl Graham, 1996

Footnotes:

1 Hypertext has been defined by Ted Nelson as; "non-sequential writing — text that branches and allows choices to the reader, best read at an interactive screen." Theodore Holm Nelson, *Literary Machines*. Mindful Press, Sausalito 1990.

2 Robert Coover quoted in Regina Cornwell 'Interactive Art and the Video Game: Separating the Siblings' *Camerawork* (San Francisco) Spring/Summer '93.

3 Alluquère Rosanne Stone 'Will The Real Body Please Stand Up?: Boundary Stories about Cyberspace' in Michael Benedikt (ed) *Cyberspace: First Steps*. MIT Press, Cambridge 1991.

4 Vivian Sobchack quoted in Alluquère Rosanne Stone *op. cit.*

5 The piece is adapted from the Mandala children's game, where a small video camera records the player, and puts their image onto a video screen where they can trigger interaction with the on-screen graphics. The game includes scenarios where the viewer can be an ice-hockey goalie, or play the bongo drums.

6 Leslie Garis 'Susan Sontag Finds Romance' *The New York Times Magazine* 2nd August '92 quoted in Regina Cornwell *op. cit.*

7 Peter Lunenfeld 'Digital Dialectics: A Hybrid Theory of Computer Media' *AfterImage* November '93.

8 Alluquère Rosanne Stone *op. cit.*

9 Ann-Sargent Wooster 'Reach Out and Touch Someone: The Romance of Interactivity' in Hall and Fifer (eds), *Illuminating Video*. Aperture, New York 1991.

10 Michael Kirby quoted in Ann-Sargent Wooster *op. cit.*

11 Thomas Disch's views described by Ann-Sargent Wooster *op. cit.*

12 Computer bulletin boards are systems whereby computers including home personal computers are connected via modems and telephone lines to each other, and can send and receive text messages, or browse a collective pool of data to which anyone can contribute (that is, anyone with the technology, the knowledge, and the money for phone bills/commercial subscription fees if they don't have access to College nets). See also note no.40.

13 For a fuller description of this piece, see *Ten.8* vol. 2 no. 2.

14 Grahame Weinbren 'Pointing at an Interactive Cinema' *Camerawork, ibid.*

15 Shown as part of the one-person show Gary Hill: In the Light of the Other, which toured to venues including the Museum of Modern Art, Oxford in 1993.

16 Quoted in Tim Druckery 'Electronic Representation: Imaging beyond Photography' *Camerawork , ibid.*

17 A CD-ROM, produced by The Voyager Company (USA), which presents Meyer's black and white photography work, with commentary, as a simple interactive narrative/slide show.

18 Ann-Sargent Wooster *op. cit.*

19 Alluquère Rosanne Stone, describing Frances Barker's arguments, *op. cit.*

20 Frances Barker quoted in Alluquère Rosanne Stone *op. cit.*

21 My article 'The Panic Button: Interactive Pornography and Gender' in *Ten.8* vol. 2 no. 4 'Virtual Dialogues' (forthcoming 1994), explores this in more detail.

22 Rosalind Krauss 'Video: The Aesthetics of Narcissism' in Gregory Battcock (ed.) *New Artist's Video*. E. P. Dutton, New York, 1978.

23 By Monika Fleishmann, Christian A. Bohn, and Wolfgang Strauss, 1993.

24 Peter Lunenfeld *op. cit.*

25 A media artist based in San Francisco.

26 *Village Voice* (USA) 12 Mar 1991.

27 For further description see *High Performance*, Issue 36 1986.

28 Work in progress seen at the Banff Centre for the Arts, 1993.

29 Lynn Hershman 'Art-ificial Sub-versions, Inter-action, and the New Reality' *Camerawork, op. cit.*

30 Norman M. Klein 'Audience Culture and The Video Screen' in Hall and Fifer (eds.), *ibid.*

31 Alluquère Rosanne Stone, *op. cit.*

32 Including: Donna Haraway *Simians, Cyborgs, and Women* Routledge, New York 1990. Vivian Sobchack 'What in the world: Vivian Sobchack on new age mutant ninja hackers' *Artforum* v29 April '91. N. Katherine Hayles 'Virtual Bodies and Flickering Signifiers' *October* vol 66 Fall '93. Works referenced in this chapter, and others too numerous to mention.

33 Alluquère Rosanne Stone, *op. cit.*

34 Alluquère Rosanne Stone, *op. cit.*

35 Convivial Design Inc., based in San Francisco and run by Pat Roberts, has created amongst other things the CD-ROM *Creation Stories,* with artwork by Jocelyn Cohen, Grace Chen and Hagit Cohen.

36 A CD-ROM created by Robyn Davidson and Rick Smolan, Against All Odds Productions 1992. Produced by Magnum Design in cooperation with Apple Computer.

37 Peter d'Agostino 'Interventions of the Present: Three Interactive Videodisks, 1981-90' in Hall and Fifer (eds), *ibid.*

38 For further descriptions see Grahame Weinbren *op. cit.*

39 Host of a comedy show of home videos.

40 For descriptions of some image-based telecommunication arts events see: Steven Durland 'Defining the Image as Place: A Conversation with Kit Galloway, Sherrie Rabinowitz and Gene Youngblood' in Arlene Raven (ed), *Art in the Public Interest*. UMI Research Press, Ann Arbor 1989. Artur Matuck 'Intercities Sao Paulo/Pittsburg' *Leonardo* vol. 24 no. 2.

41 Regina Cornwell *op. cit.*

42 See *Museums Journal* vol. 93 February '93, for a special issue on the subject.

43 Brenda Laurel is working with a team of other artists from Interval Research, at Banff Centre for the Arts (in Canada), producing a virtual reality piece using images 'sampled' from nature. Toni Dove and Michael MacKenzie also produced *Archaeology of a Mother Tongue* at Banff; a VR piece constructed as a theatrical interactive narrative.

44 Regina Cornwell *op. cit.*

Appendix III: Data from case studies

a) Data from questionnaire responses
b) Data concerning patterns of use
c) Sample Questionnaire, Data forms, and artists' response form

Notes:

Where an average is mentioned, it is a mean unless stated otherwise.

Definitions of activities are given in Case Studies chapters.

Where 'averages' of questionnaire judgements are mentioned, the responses have been given 'scores', and then the mean score calculated.

Appendix III a: Data from questionnaire responses

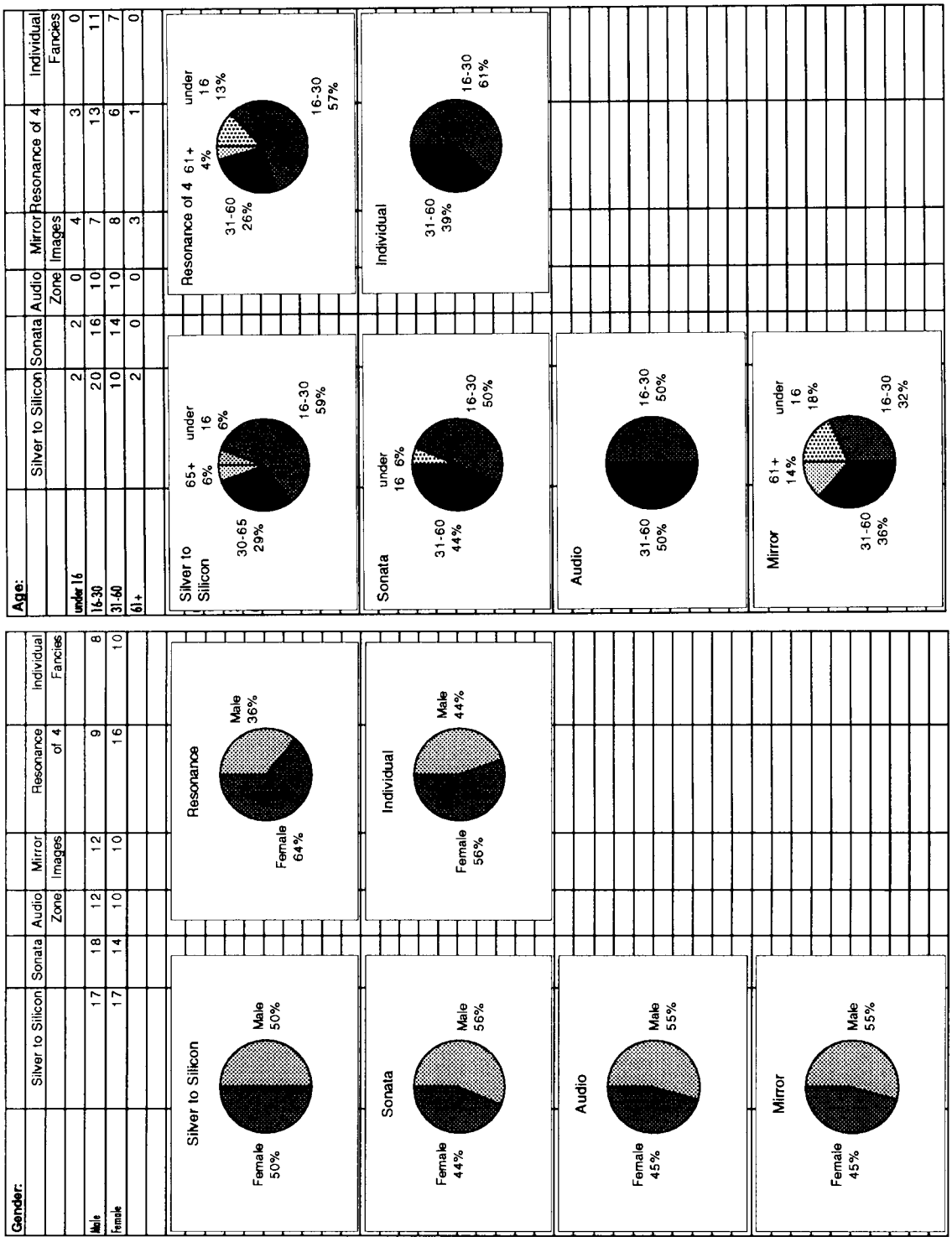


Figure 44: Case Studies; gender and age distribution of samples

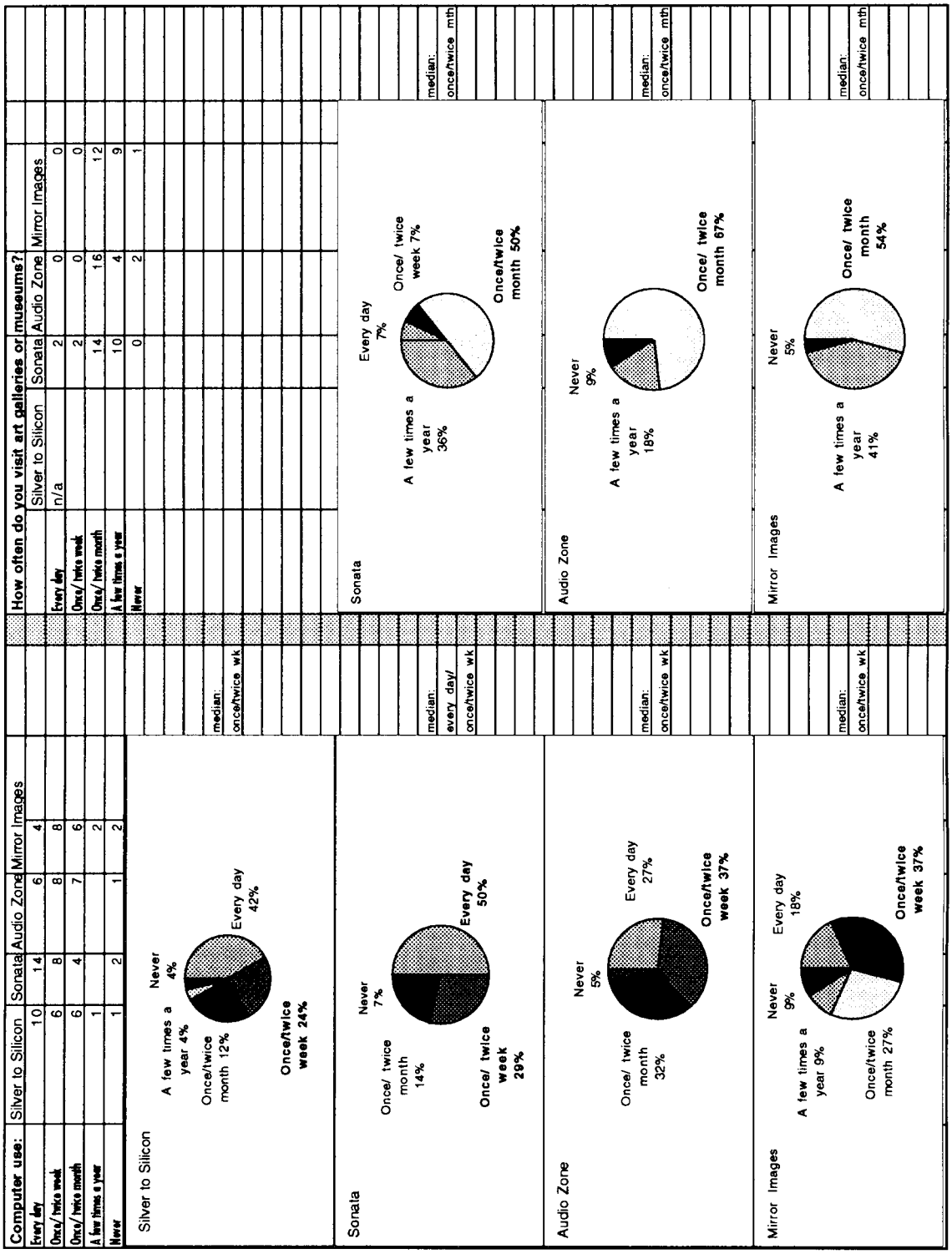


Figure 45: Case Studies; frequency of computer use/ gallery visiting of samples

Ease of use:	Silver to Silicon	Sonata	Audio Zone	Mirror Images
Easy	10	12	10	17
Fairly Easy	7	12	12	5
Difficult	5	2		
V. Difficult		2		

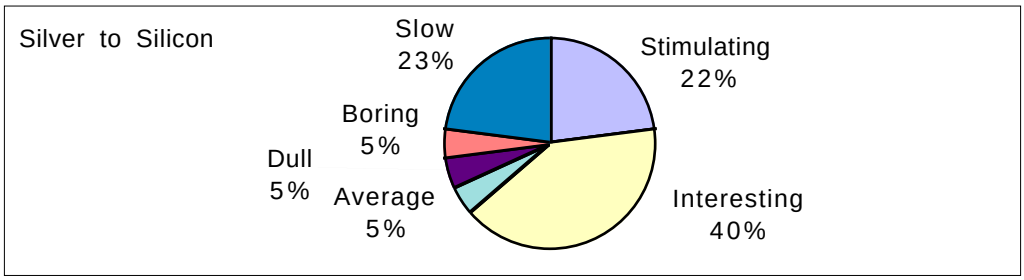
Level of Control:	Silver to Silicon	Sonata	Audio Zone	Mirror Images
Full	1	2	6	4
Partial	11	6	10	12
Limited	8	10	6	4
Not at all	2	10	0	2

Figure 46: Case Studies; judgements on ease of use/ control.

Intimidated or embarrassed ?	Silver to Silicon	Sonata	Audio	Mirror Images
Yes	2	1	4	6
No	20	27	18	16
Of 'Yes': male/female:	1m1f	1m0f	4m0f	0m6f

Alone or with others (from observation):	Silver to Silicon	Sonata	Audio Zone	Mirror Images	Resonance of 4	Individual Fancies
Alone	14	16	15	10	4	6
With others	20	16	7	12	21	12

Figure 47: Case Studies; responses to question on intimidation, and distribution of samples alone/with others.



Averaged responses to judgements of quality (scoring 1-5 then finding mean)						
Score	**Verbal approx.**		**Sonata**	**Audio Zone**	**Mirror Images**	
1	Interesting					
2	Fairly interesting			•	•	
3	Neutral		•			
4	Fairly boring					
5	Boring					
1	Too fast					
2	A bit too fast					
3	Neutral		•	•		
4	A bit too slow				•	
5	Too slow					
1	Approachable					
2	Fairly approachable		•	•	•	
3	Neutral					
4	Fairly intimidating					
5	Intimidating					
1	Meaningful					
2	Fairly meaningful					
3	Neutral		•	•	•	
4	Fairly meaningless					
5	Meaningless					
1	Too obvious					
2	A bit too obvious					
3	Neutral		•	•	•	
4	A bit too vague					
5	Too vague					
1	Satisfying					
2	Fairly satisfying					
3	Neutral		•	•	•	
4	Fairly frustrating					
5	Frustrating					
1	Participative					
2	Fairly participative				•	
3	Neutral		•	•		
4	Fairly passive					
5	Passive					

Figure 48: Case Studies; questionnaire judgements of quality

Appendix III b Data concerning patterns of use

	Silver to Silicon	Sonata	Audio Zone	Mirror Images	Resonance of 4	Individual Fancies
Users' mean use time	00:18:18	00:07:12	00:10:53	00:01:52	00:08:44	00:07:48
Standard Deviation	00:20:07	00:06:26	00:04:58	00:01:24	00:10:40	00:04:40

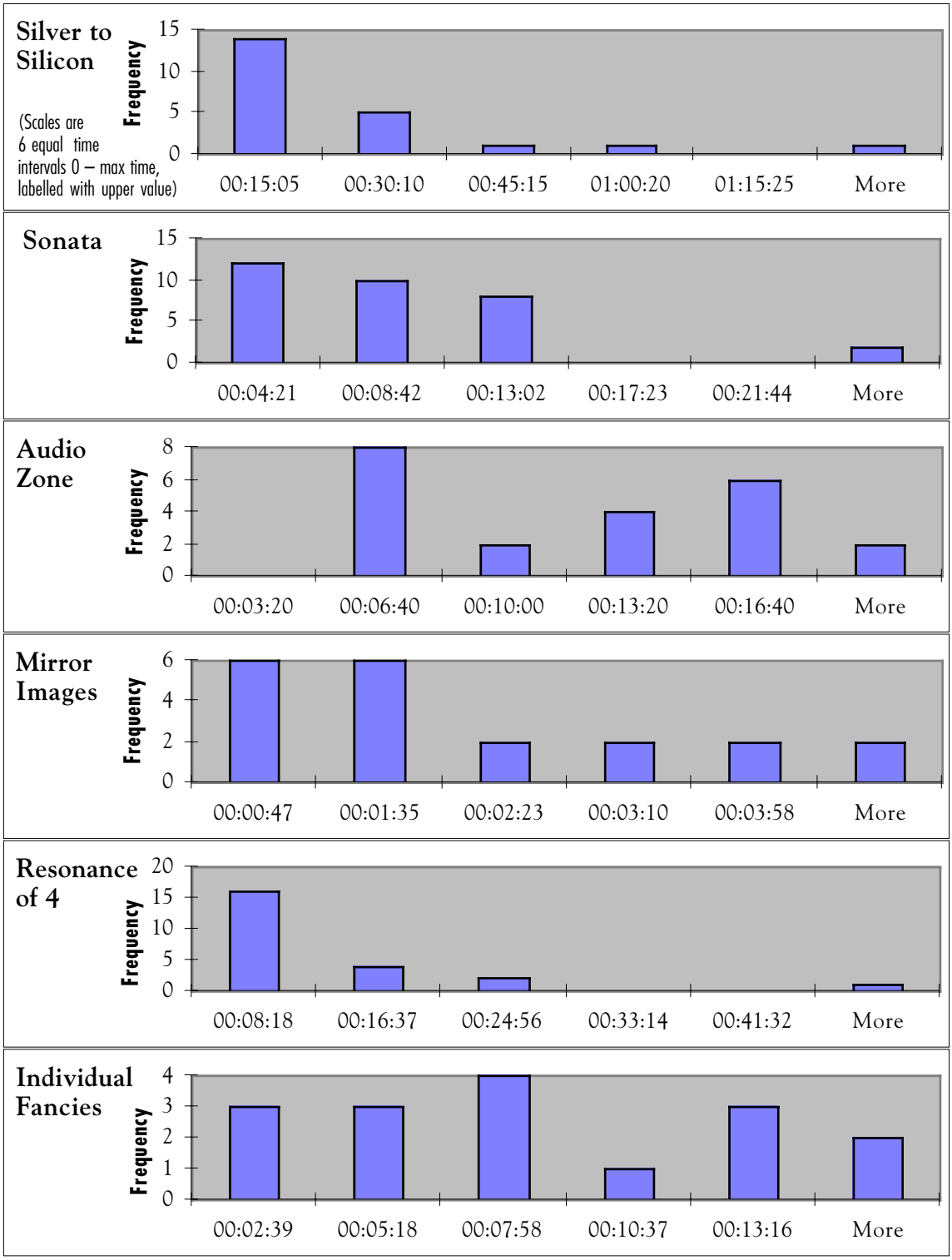


Table 2: Users' mean use times, with Standard Deviations, and histograms.

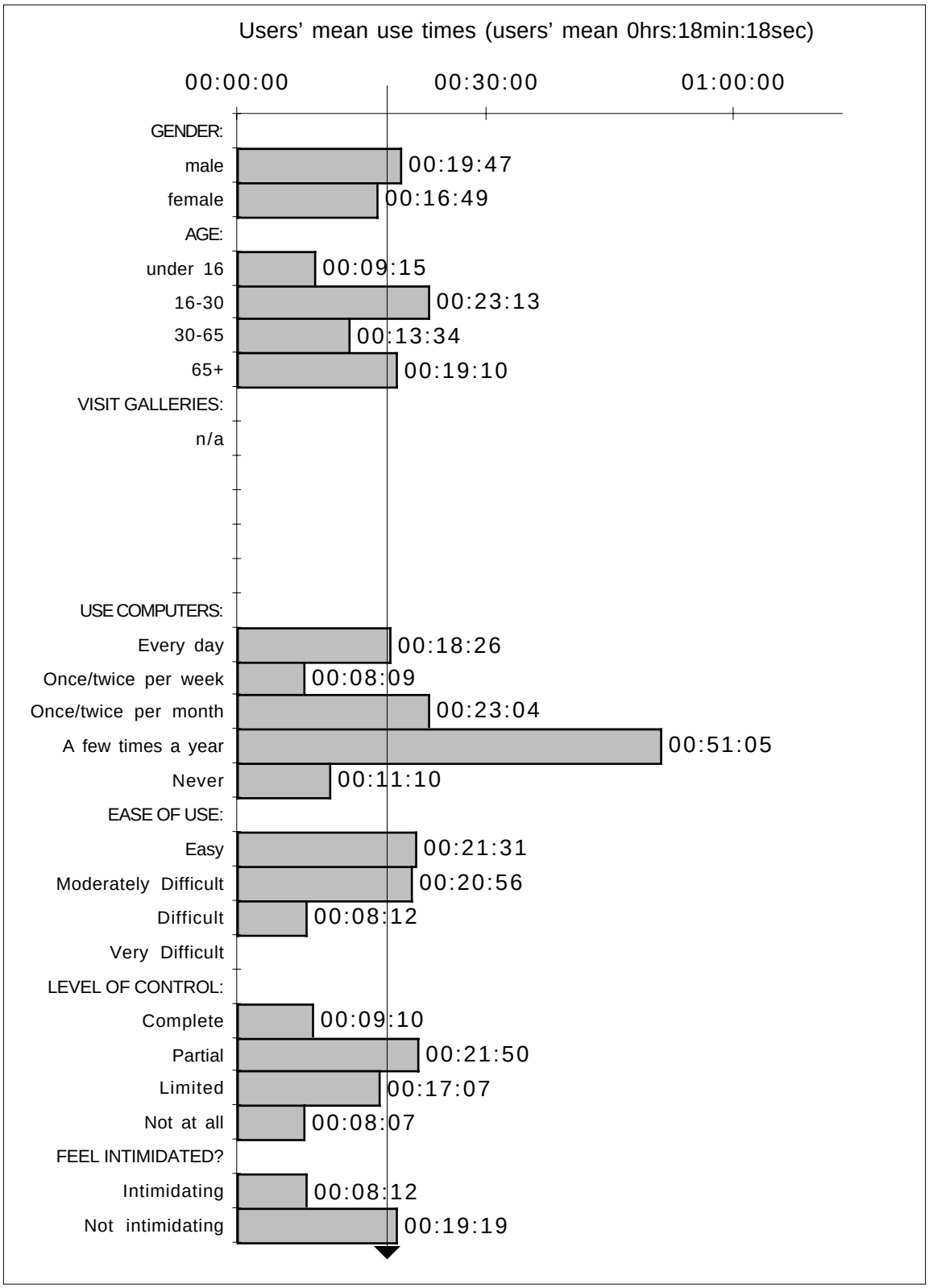


Figure 49: *Silver to Silicon*; questionnaire responses related to mean use times.

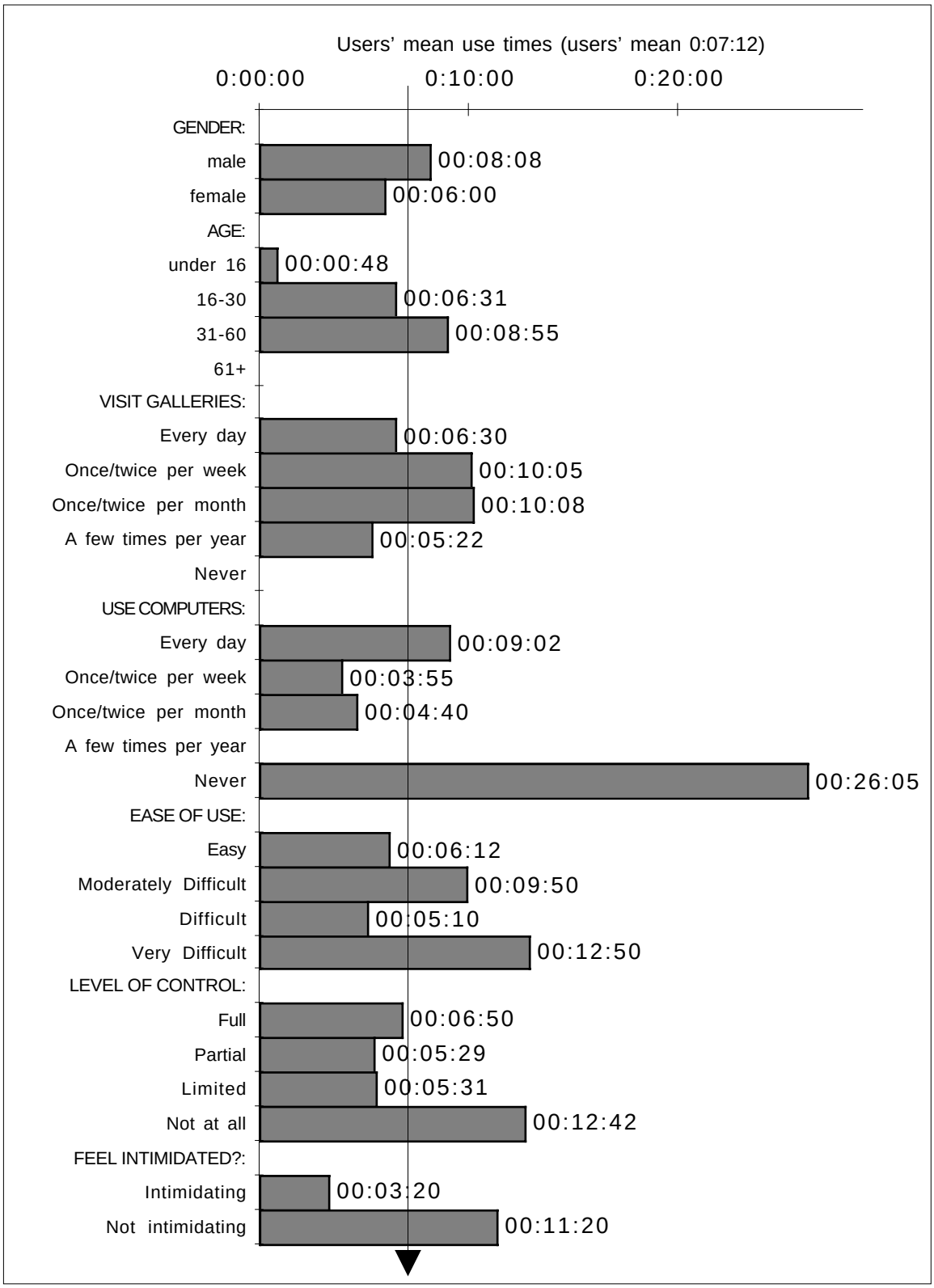


Figure 50: *Sonata*; questionnaire responses related to mean use times.

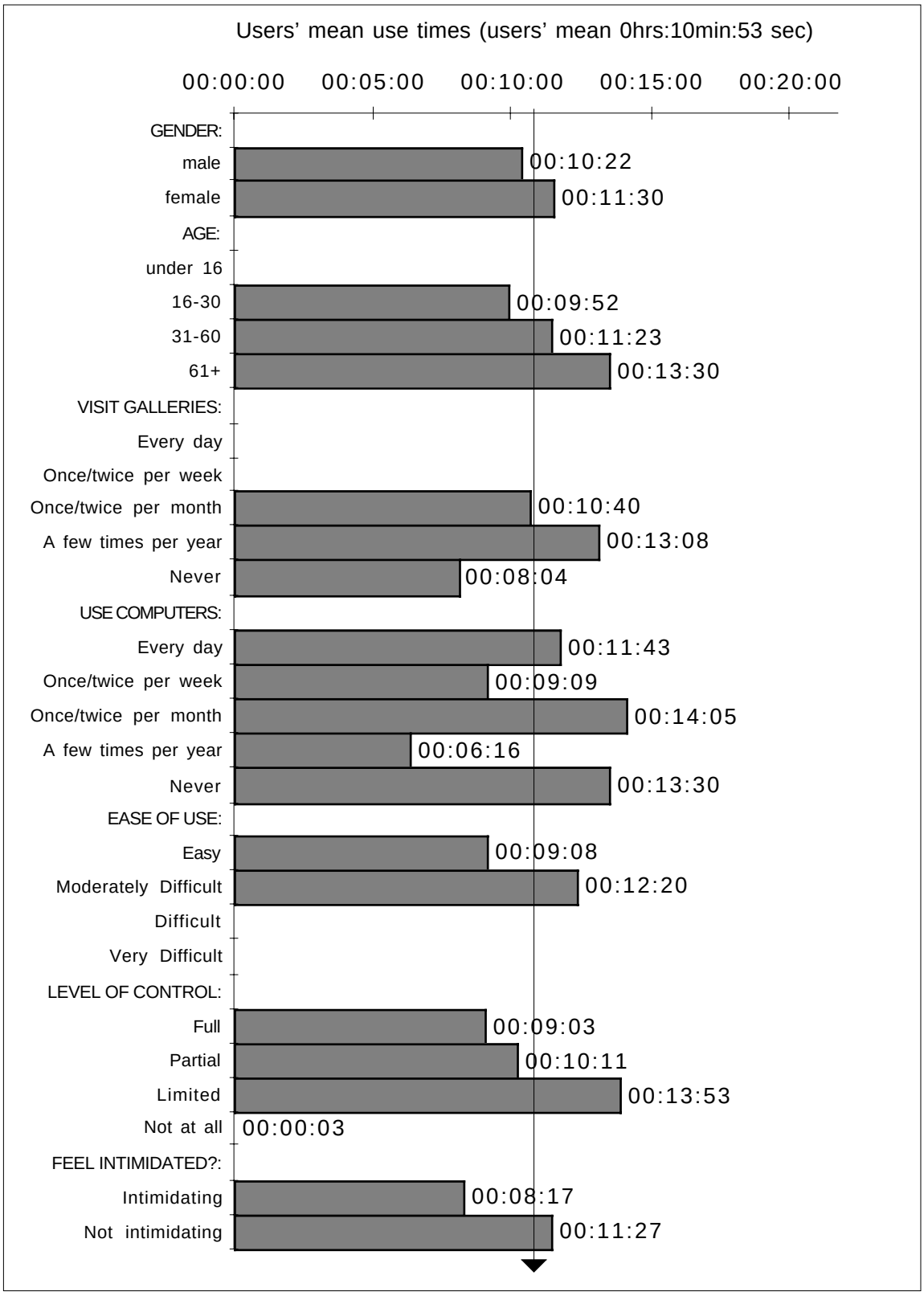


Figure 51: *Audio Zone*; questionnaire responses related to mean use times.

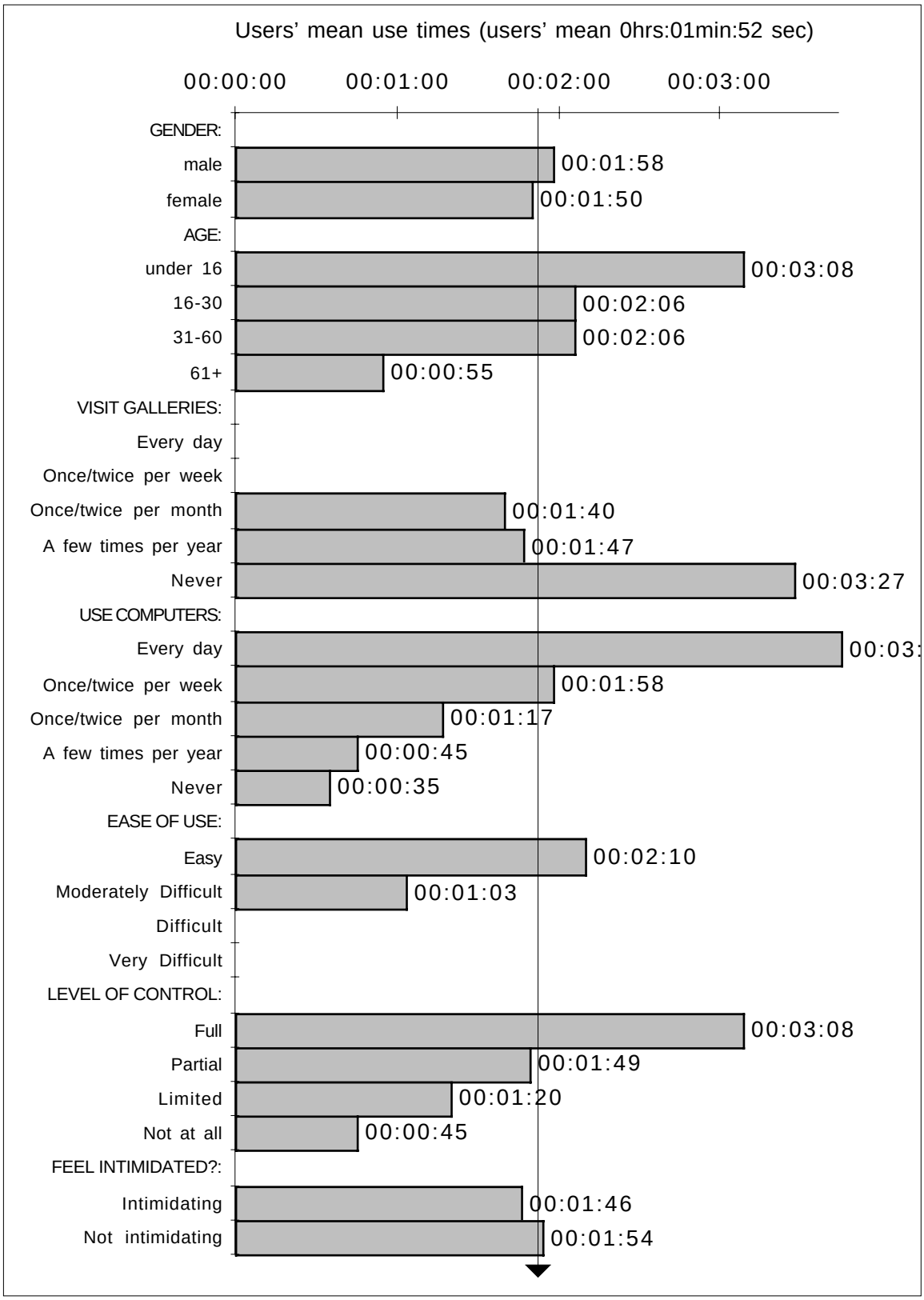


Figure 52: *Mirror Images*; questionnaire responses related to mean use times.

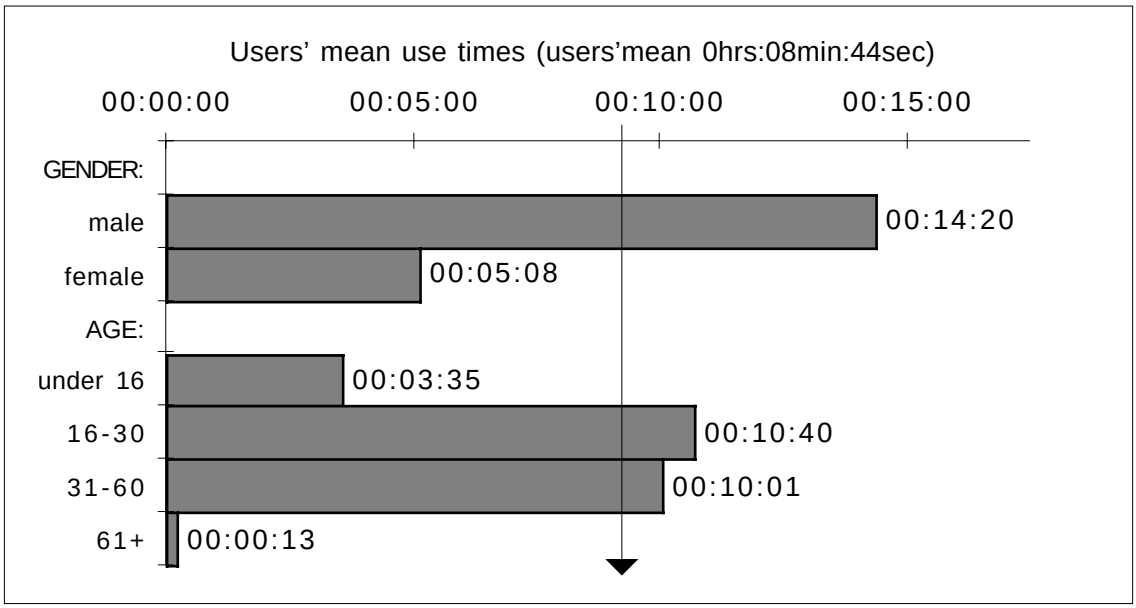


Figure 53: *Resonance of 4*; gender and age related to mean use times.

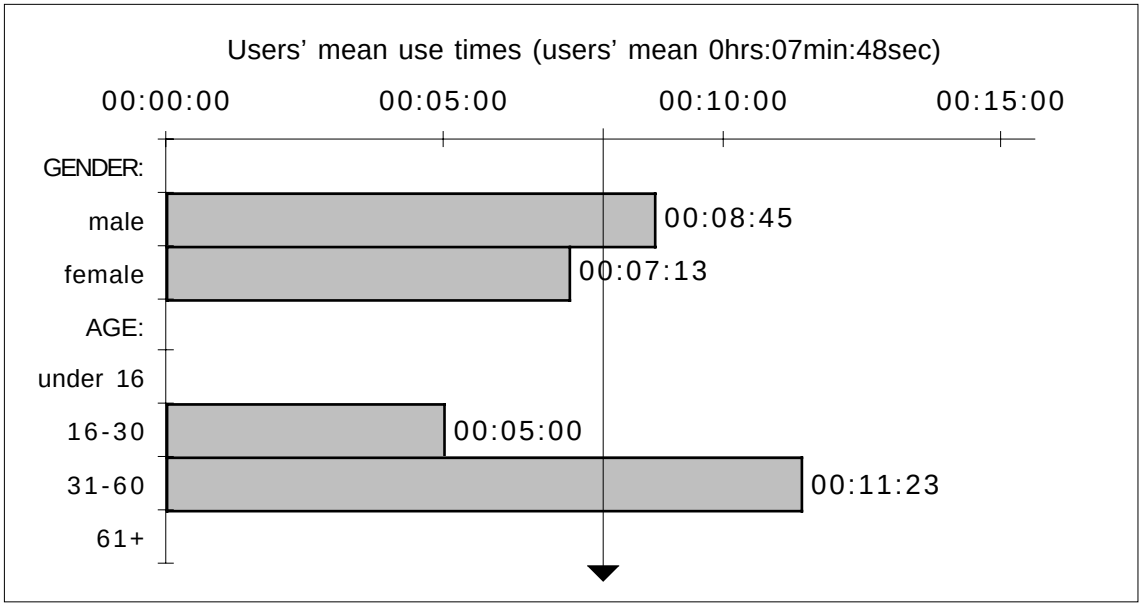


Figure 54: *Individual Fancies*; gender and age related to mean use times.

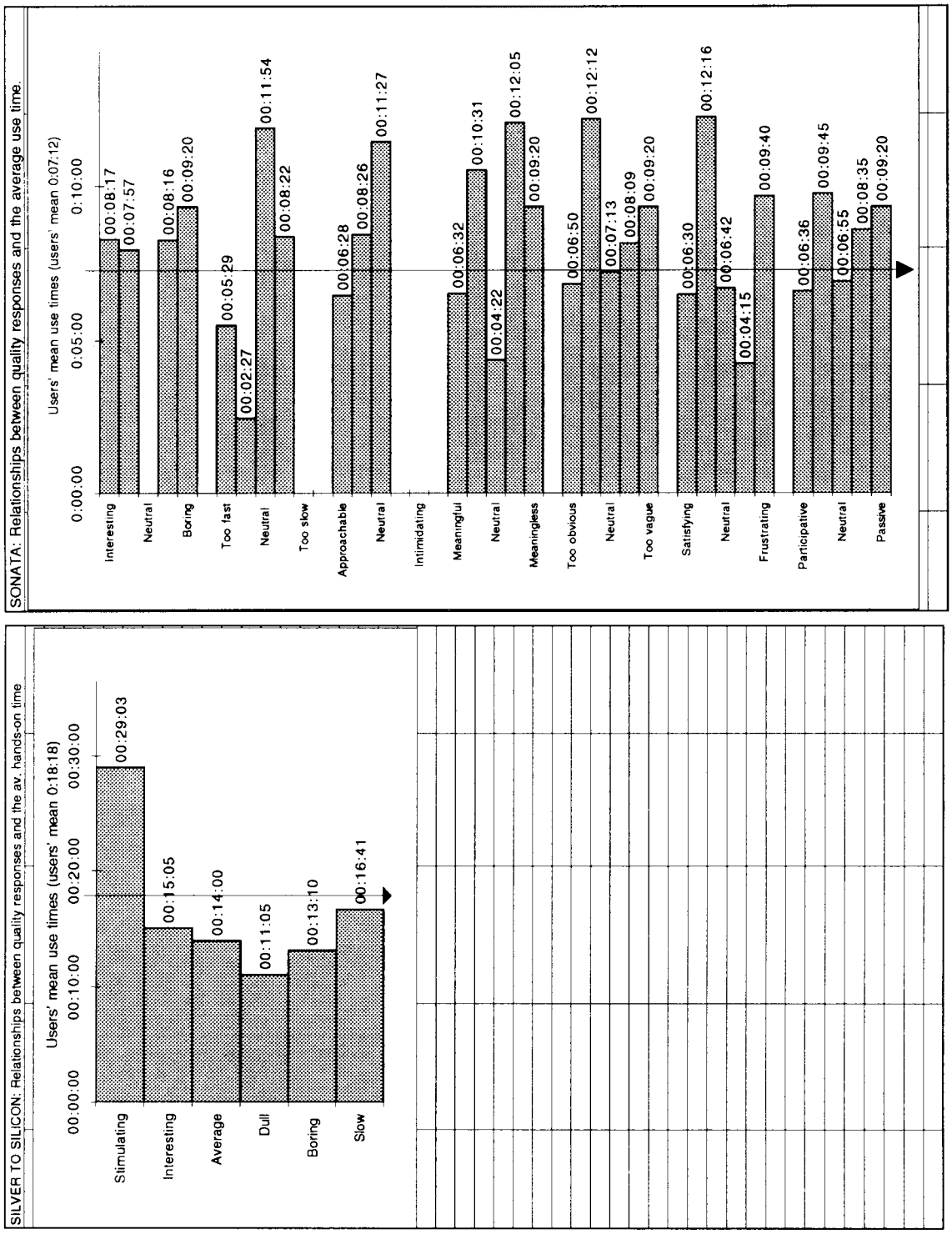


Figure 55: Judgements of quality related to mean use times; *Silver to Silicon* and *Sonata*

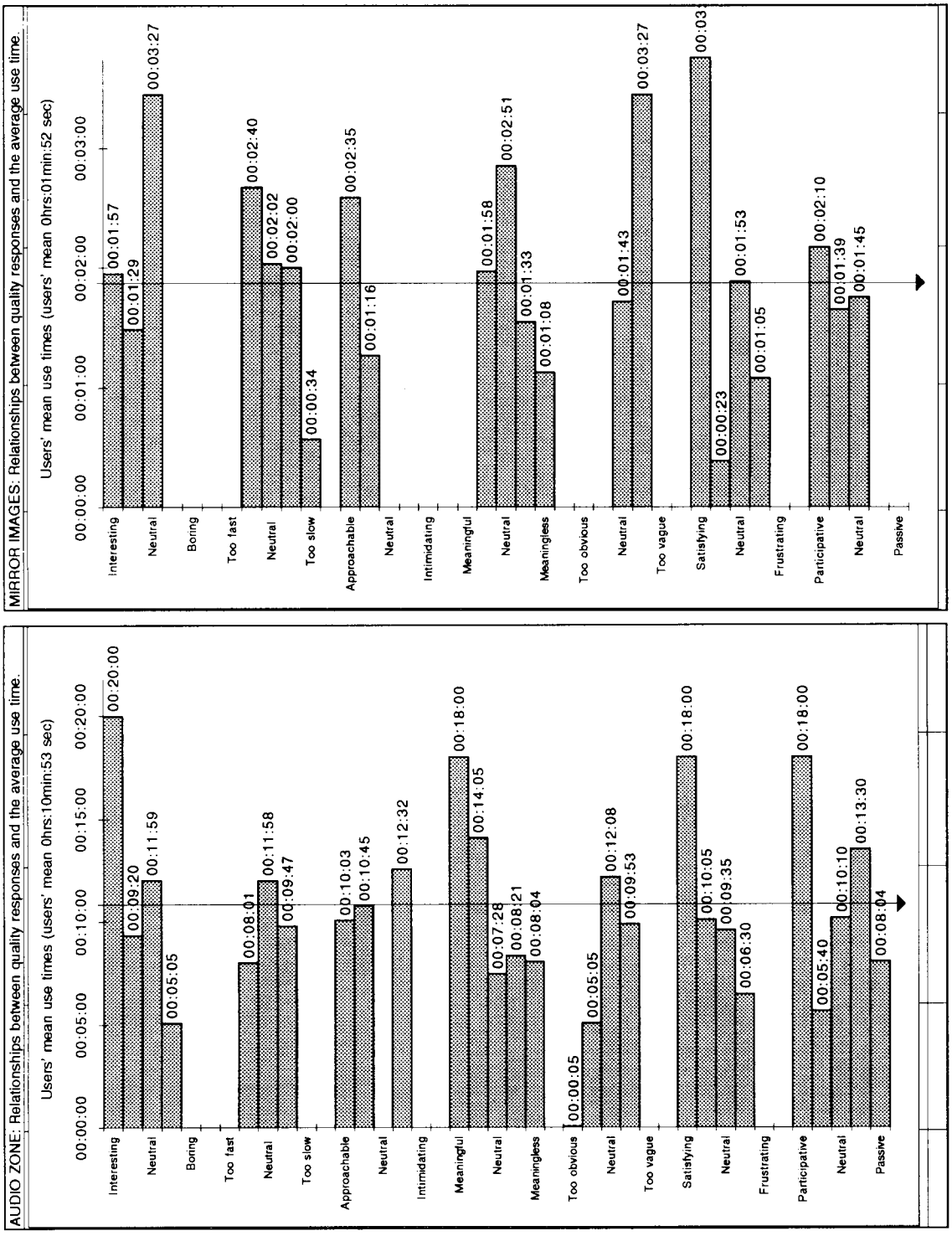


Figure 56: Judgements of quality related to use times; *Audio Zone* and *Mirror Images*.

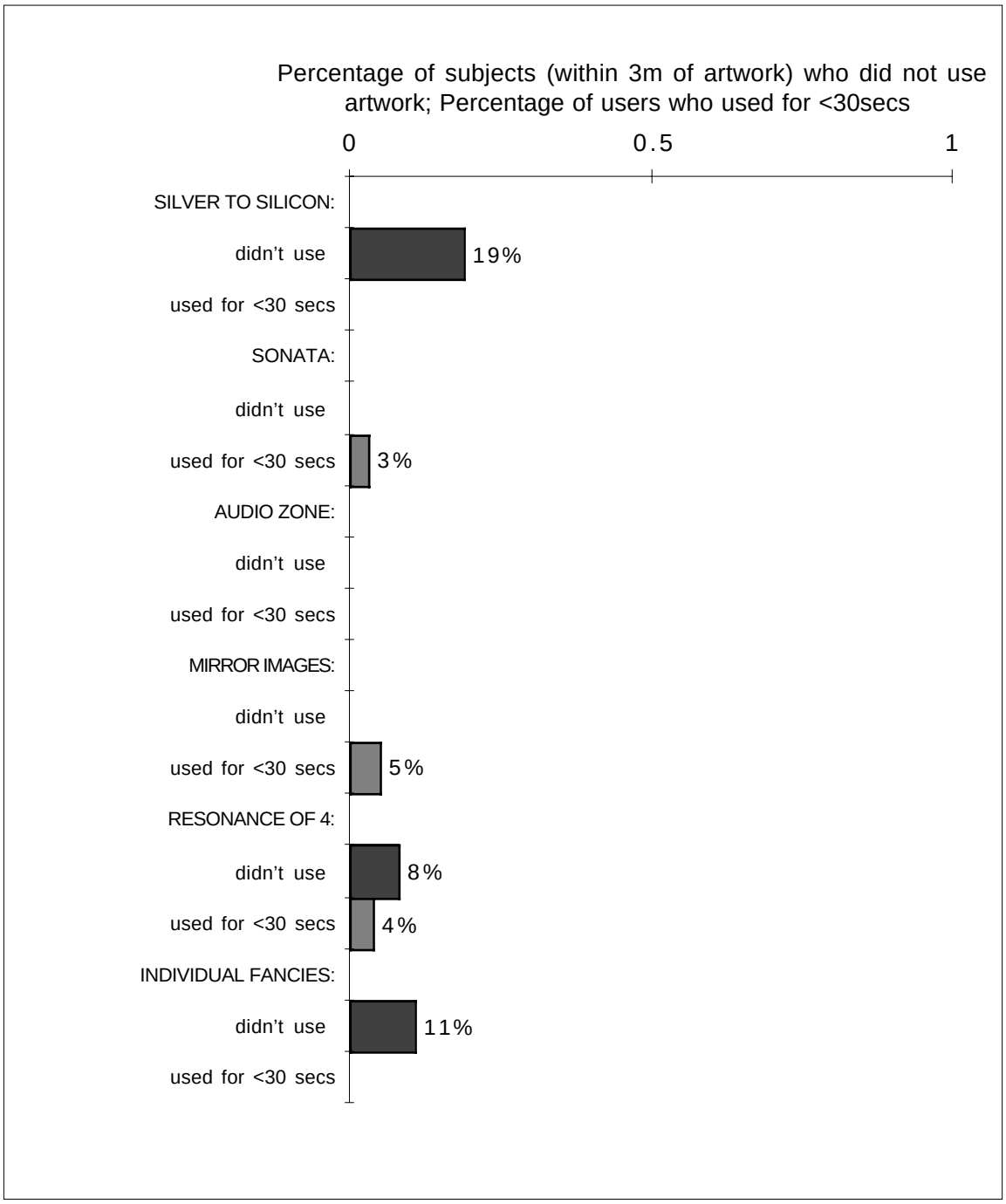


Figure 57: Case Studies; Occurrence of non-use, and use for <30 sec.

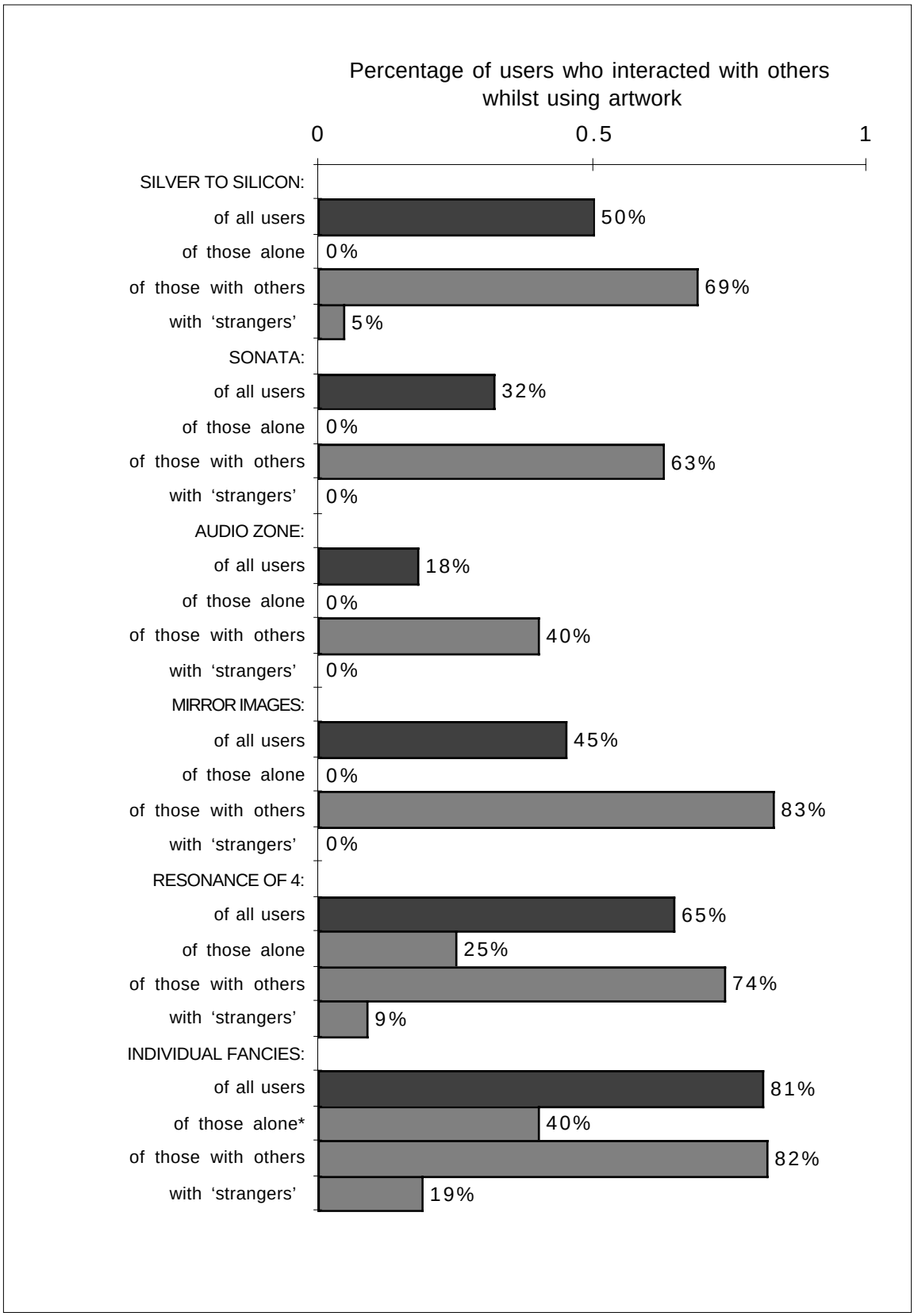


Figure 58: Case Studies; occurrence of interaction with other people.

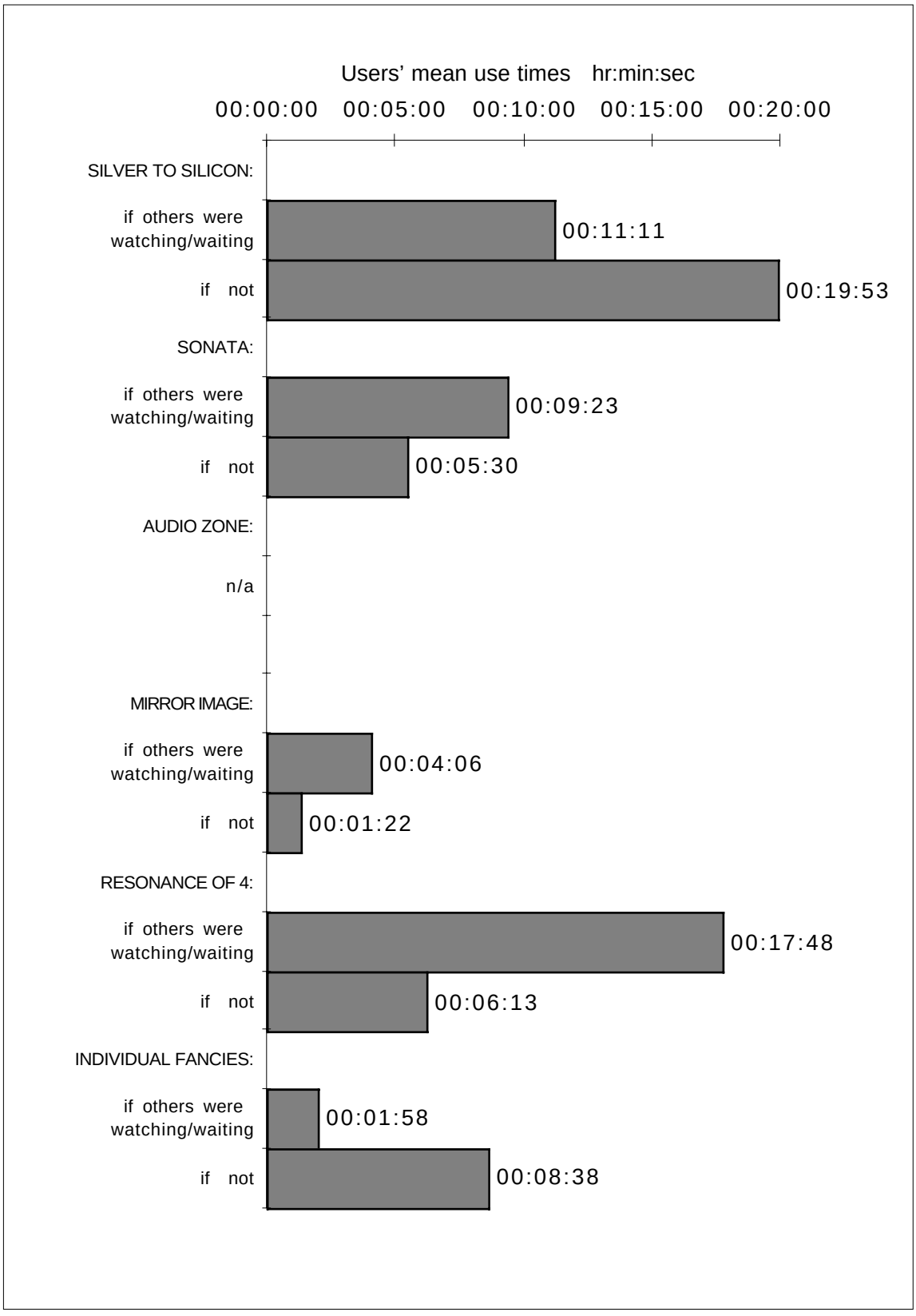


Figure 59: Case Studies; Presence of others watching/waiting related to use times.

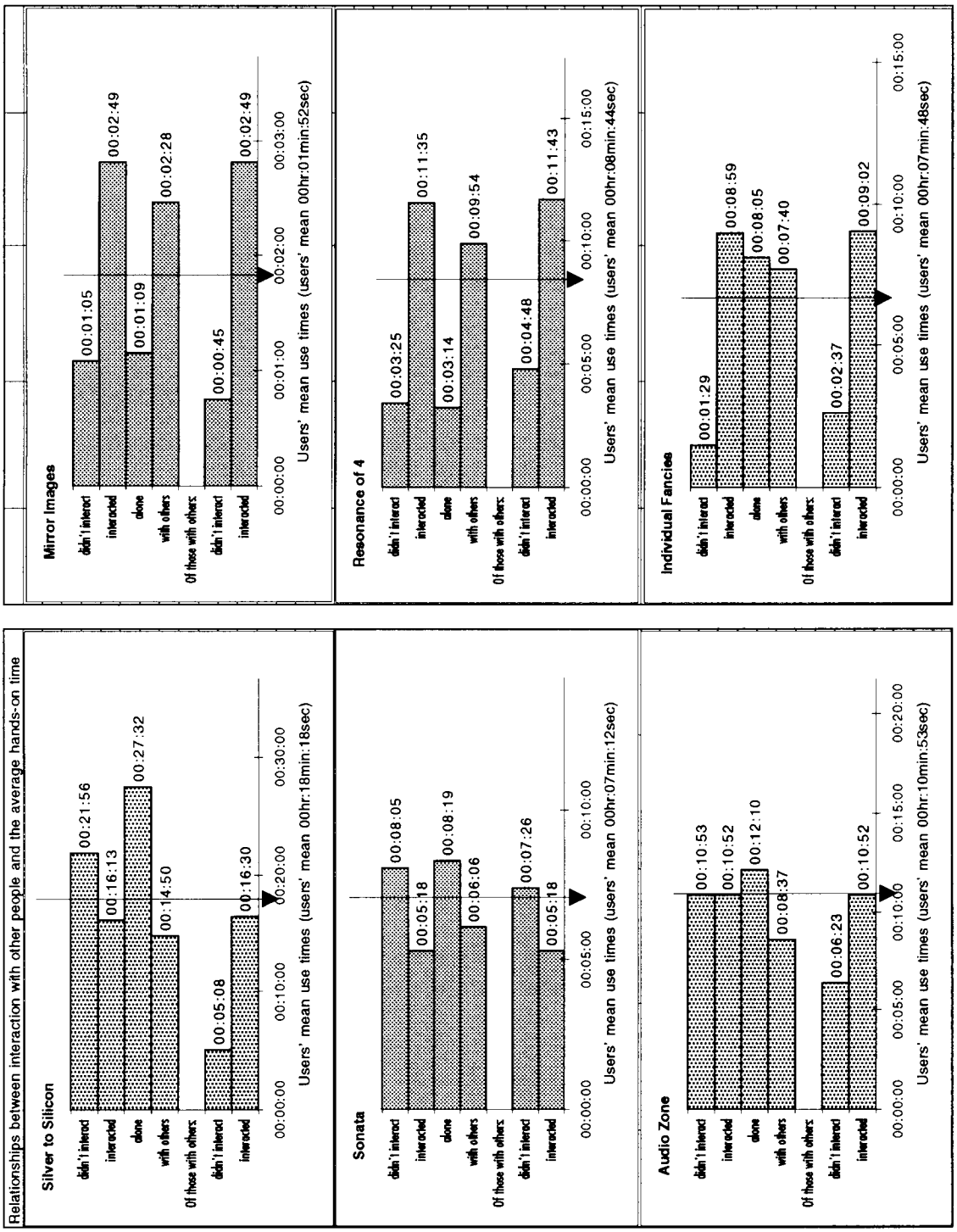
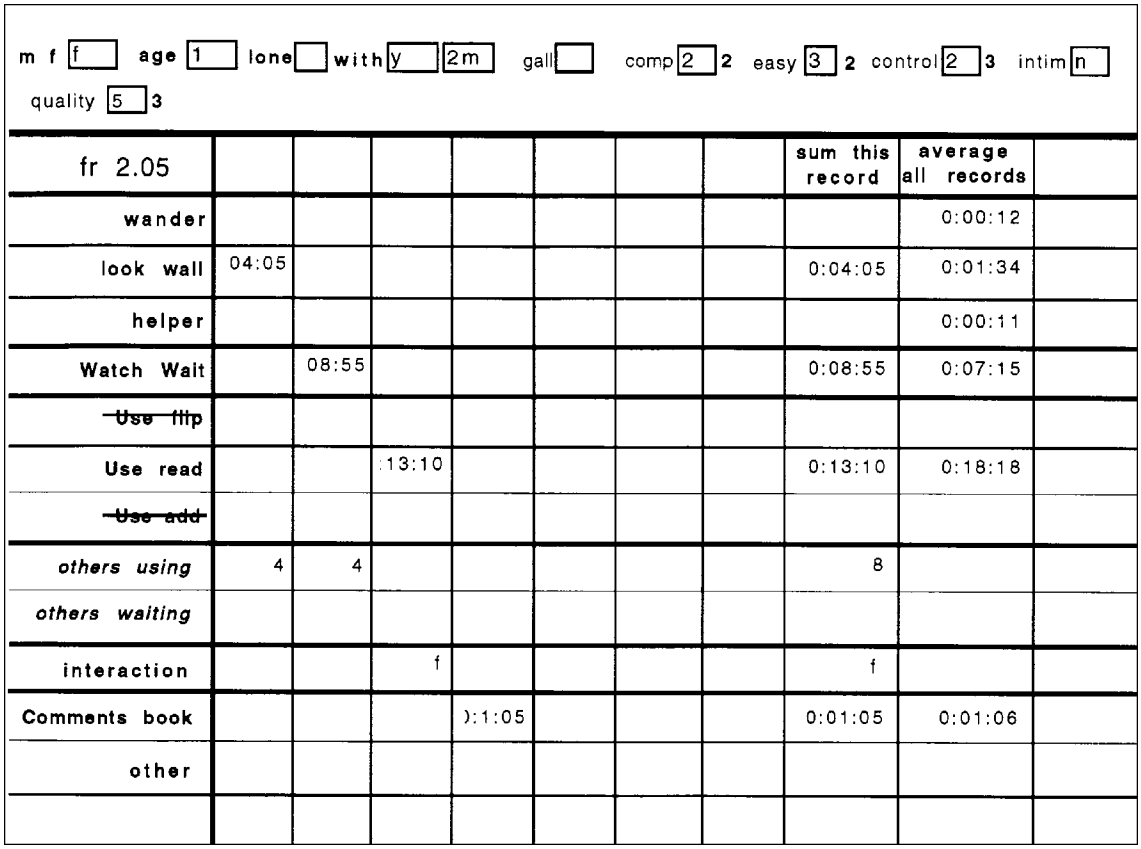


Figure 60: Case Studies; interaction between people related to use times.

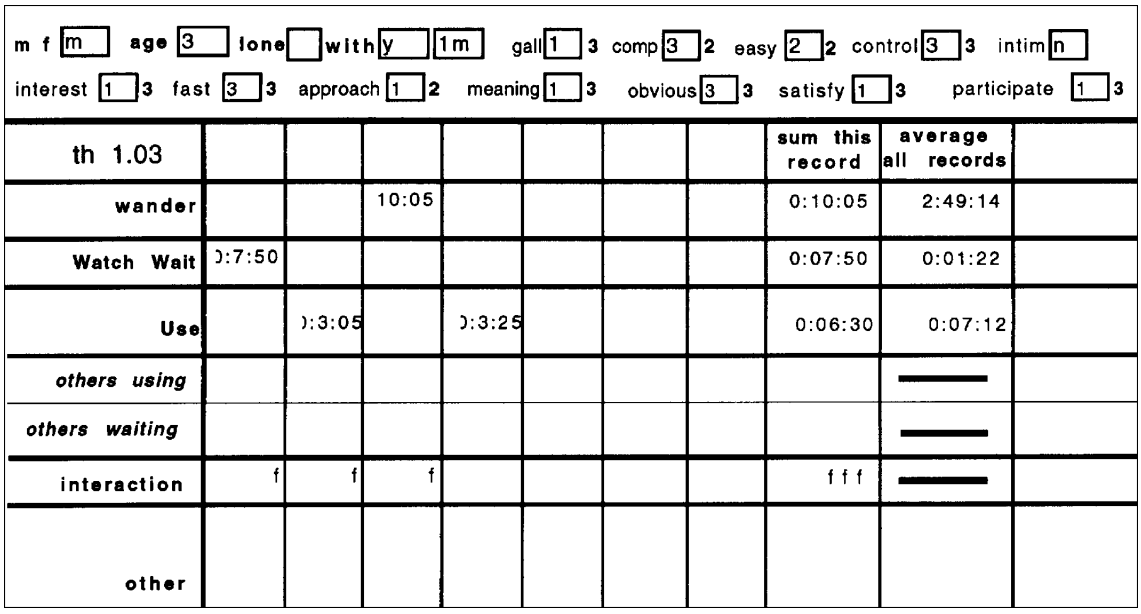
Appendix III c: Sample Questionnaires, Data forms, etc.



m f [f] age [1] lone [ ] with [y] [2m] gall [ ] comp [2] 2 easy [3] 2 control [2] 3 intim [n]
quality [5] 3

fr 2.05								sum this record	average all records	
wander									0:00:12	
look wall	04:05							0:04:05	0:01:34	
helper									0:00:11	
Watch Wait		08:55						0:08:55	0:07:15	
~~Use flip~~										
Use read			:13:10					0:13:10	0:18:18	
~~Use add~~										
others using	4	4						8		
others waiting										
interaction			f					f		
Comments book				):1:05				0:01:05	0:01:06	
other										

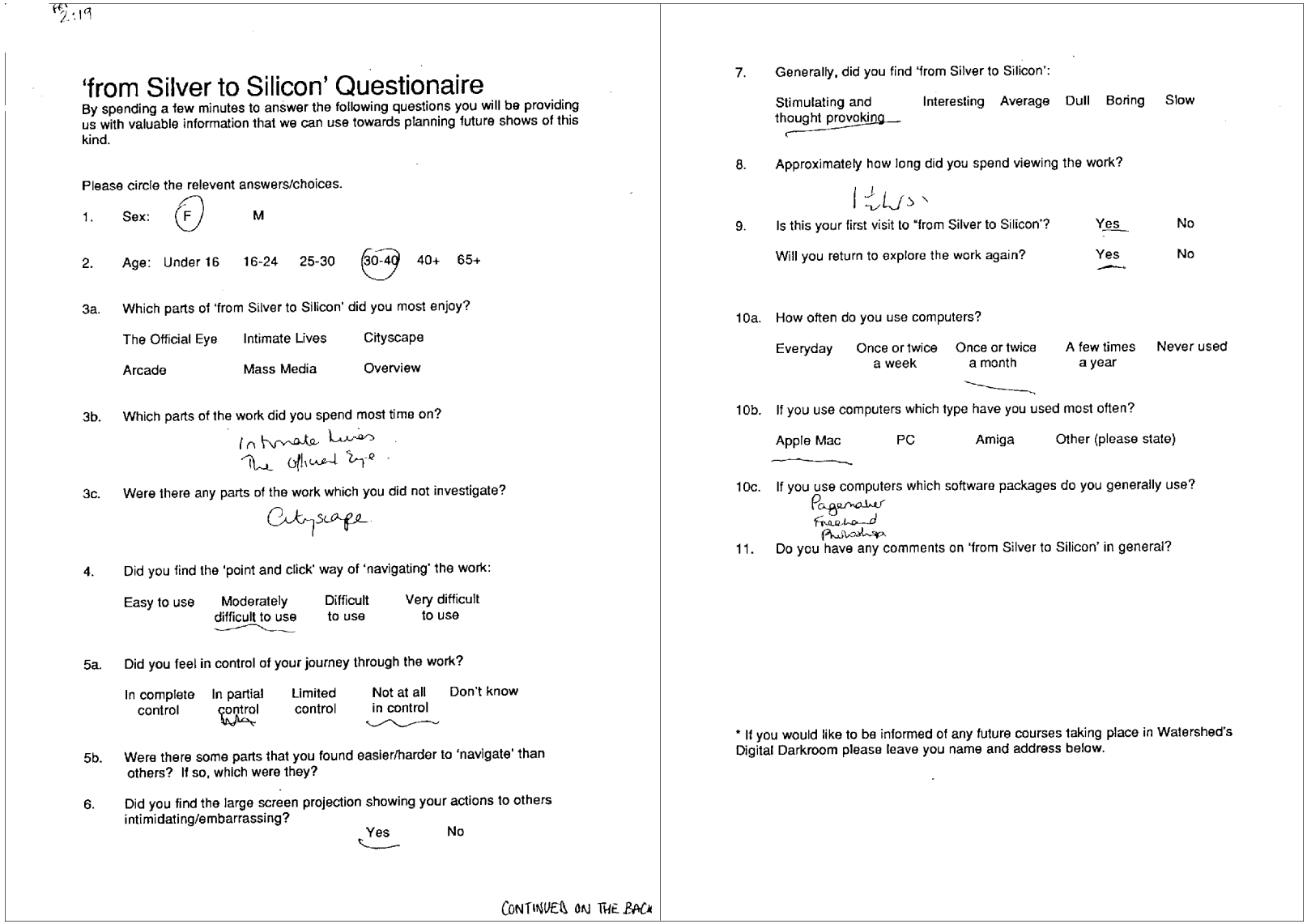
Figure 61: Sample Watershed Gallery observation form



m f [m] age [3] lone [ ] with [y] [1m] gall [1] 3 comp [3] 2 easy [2] 2 control [3] 3 intim [n]
interest [1] 3 fast [3] 3 approach [1] 2 meaning [1] 3 obvious [3] 3 satisfy [1] 3 participate [1] 3

th 1.03								sum this record	average all records	
wander			10:05					0:10:05	2:49:14	
Watch Wait	):7:50							0:07:50	0:01:22	
Use		):3:05		):3:25				0:06:30	0:07:12	
others using									—	
others waiting									—	
interaction	f	f	f					f f f	—	
other										

Figure 62: Sample *V-Topia* observation sheet



'from Silver to Silicon' Questionaire

By spending a few minutes to answer the following questions you will be providing us with valuable information that we can use towards planning future shows of this kind.

Please circle the relevent answers/choices.

1. Sex: (F) M

2. Age: Under 16 16-24 25-30 (30-40) 40+ 65+

3a. Which parts of 'from Silver to Silicon' did you most enjoy?

The Official Eye Intimate Lives Cityscape

Arcade Mass Media Overview

3b. Which parts of the work did you spend most time on?

Intimate Lives
The Official Eye

3c. Were there any parts of the work which you did not investigate?

Cityscape

4. Did you find the 'point and click' way of 'navigating' the work:

Easy to use | Moderately difficult to use | Difficult to use | Very difficult to use

5a. Did you feel in control of your journey through the work?

In complete control | In partial control | Limited control | Not at all in control | Don't know

5b. Were there some parts that you found easier/harder to 'navigate' than others? If so, which were they?

6. Did you find the large screen projection showing your actions to others intimidating/embarrassing?

Yes No

CONTINUED ON THE BACK

7. Generally, did you find 'from Silver to Silicon':

Stimulating and thought provoking | Interesting | Average | Dull | Boring | Slow

8. Approximately how long did you spend viewing the work?

1 hour

9. Is this your first visit to "from Silver to Silicon'? Yes No

Will you return to explore the work again? Yes No

10a. How often do you use computers?

Everyday | Once or twice a week | Once or twice a month | A few times a year | Never used

10b. If you use computers which type have you used most often?

Apple Mac PC Amiga Other (please state)

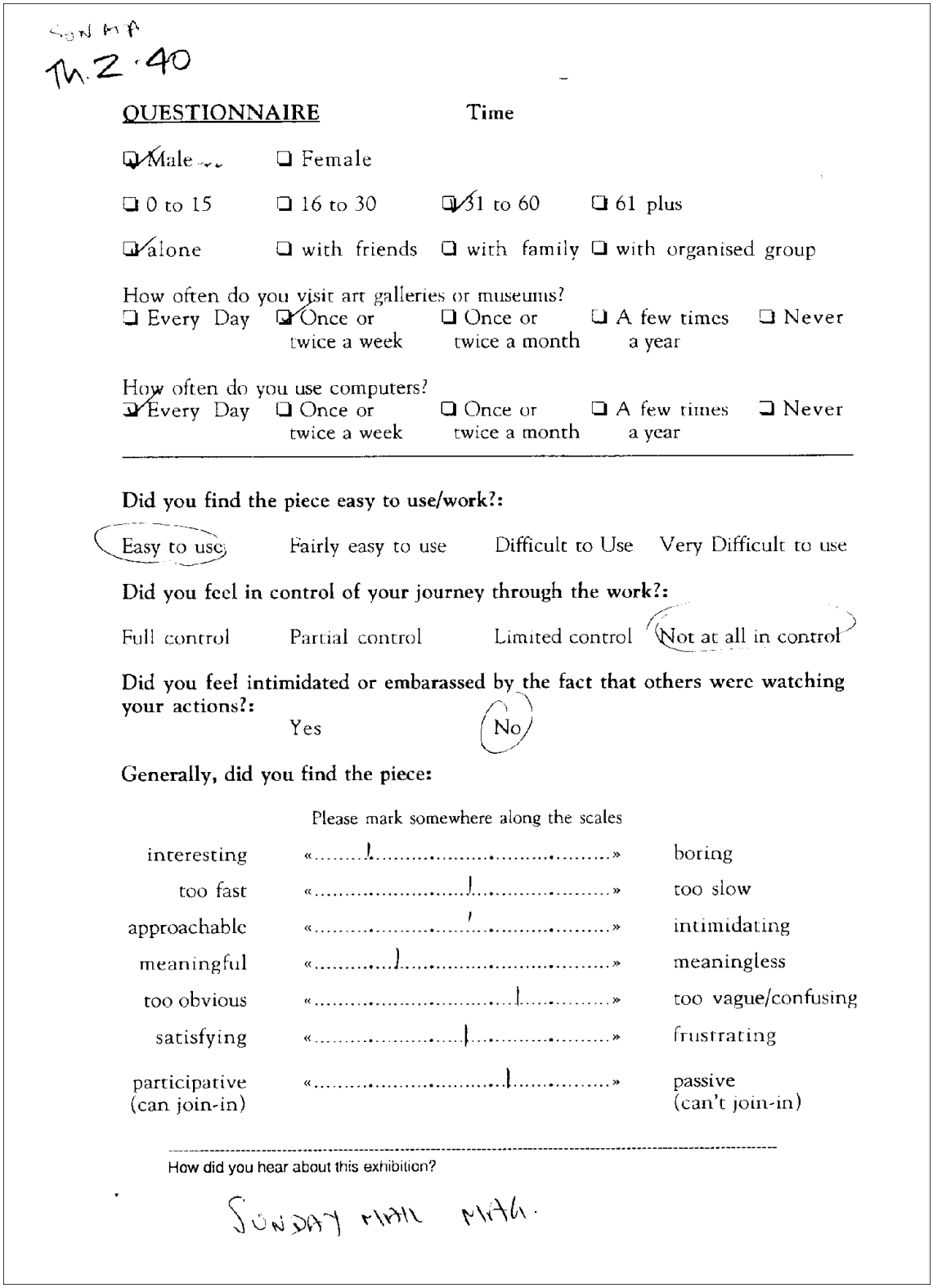
10c. If you use computers which software packages do you generally use?

Pagemaker
Freehand
Photoshop

11. Do you have any comments on 'from Silver to Silicon' in general?

* If you would like to be informed of any future courses taking place in Watershed's Digital Darkroom please leave you name and address below.

Figure 63: Sample Watershed Gallery questionnaire (2 sides of A4 reduced)



SUN PM
Th 2·40

QUESTIONNAIRE Time

☑ Male ❑ Female

❑ 0 to 15 ❑ 16 to 30 ☑ 31 to 60 ❑ 61 plus

☑ alone ❑ with friends ❑ with family ❑ with organised group

How often do you visit art galleries or museums?
❑ Every Day ☑ Once or twice a week ❑ Once or twice a month ❑ A few times a year ❑ Never

How often do you use computers?
☑ Every Day ❑ Once or twice a week ❑ Once or twice a month ❑ A few times a year ❑ Never

---

Did you find the piece easy to use/work?:

Easy to use Fairly easy to use Difficult to Use Very Difficult to use

Did you feel in control of your journey through the work?:

Full control Partial control Limited control Not at all in control

Did you feel intimidated or embarassed by the fact that others were watching your actions?:

Yes No

Generally, did you find the piece:

Please mark somewhere along the scales

interesting	«	boring
too fast	«	too slow
approachable	«	intimidating
meaningful	«	meaningless
too obvious	«	too vague/confusing
satisfying	«	frustrating
participative (can join-in)	«	passive (can't join-in)

How did you hear about this exhibition?

SUNDAY MAIL MAG.

Figure 64: Sample *V-Topia* questionnaire (1 side A4).

Questionnaire for artists.

BACKGROUND NOTES: **OBSERVATIONAL RESEARCH WAS CARRIED OUT ON 35 PEOPLE ENTERING THE GALLERY OVER THE THREE DAY PERIOD. THE PEOPLE WERE SELECTED SYSTEMATICALLY, BEING THE FIRST PERSON TO PICK UP A HEADSET, 3 MINUTES AFTER THE LAST OBSERVED PERSON HAD BROUGHT BACK THEIR HEADSET.**

'use-time' was defined as the duration that the observed person interacted with the artwork (i.e. was in a position to be able to trigger responses from the artwork, and could see the results).

Please make a prediction for your artwork of:

How long do you think the average use-time would be?

What percentage of the users would use it for less than 30 seconds.

What percentage of the users **didn't** use the artwork in one block, but went away from the piece for a time and then returned to use it?

What percentage **of the users who came to the exhibition with other people** interacted with other people (defined as exchanging words, facial or hand gestures with any other person) whilst using your artwork?

What percentage of the users would respond that they felt intimidated or embarrassed by having their actions whilst using the artwork visible to other people?

Figure 65: Sample questionnaire requesting artists predictions on audience use of their artwork.

Appendix IV: *Serious Games* catalogue

The catalogue for the exhibition *Serious Games* is attached in a pocket with this dissertation. It is a 64 page full colour publication with statements from the artists, illustrations of the artworks, and essays by Regina Cornwell and the author.

Appendix V: Notes on making the artwork *Individual Fancies*

a) Production Diary

Diary entries summary timeline:

1995

Feb-Jun	Development of idea, and technical research
13 Jun	Installation Test: Testing LCD video projector:
Jul-Aug	Authorware programming v.1
10 Sep	Take photos of cakes, cloth etc.
12 Sep	Authorware programming v.2
13 Sep	Installation Test: Testing a prototype projected downwards onto table.
15 Sep	Authorware programming v.3
20 Sep	Scripts v.1
9 Oct	First meeting with drama students.
18 Oct	Scripts v.2
19 Oct	Installation Test: Testing improved prototype.
23 Oct	Drama students, improvisation
13 Nov	Drama students, recording first versions.
18 Nov	Scripts v.3 Search for actors.
21 Nov	Soldering switches. Sound consultant Paul Graham
Dec	Authorware programming v.4

1996

15 Jan	Authorware programming v.5
15 Jan	Drama students, recording voices onto computer. Record.
17 Jan	Scripts v.4
20 Jan	Record voice of divorced father, and Asian homeworker
22 Jan	Drama students, take pictures of hands.
24 Jan	Authorware programming v.6
25 Jan	Installation Test: Testing improved prototype.
12 Feb	Drama students: criticism session
12 Feb	Authorware programming v.7
15 Feb	Sound studio recording session
Feb	Editing sound files.
21 Feb	Retake pictures of hands
Mar/Apr	Editing hand images
April	Objects construction
April	Authorware programming v.8
25 Apr	Installation Test: Testing improved prototype with chair and teapot Plus students' work.
May	Authorware programming v.9
25 Jun	Installation Test: Testing improved prototype. Video documentation.

(gap here in timeline for concentration on *Serious Games*)

1997

Jan-Feb	Improving objects Authorware programming v.9
Mar-Apr	Preparing for exhibition
17 April	Exhibition and Case Study

Diary Entries

Notes:

A 'production diary' of the development of *Individual Fancies* was kept, with entries at major cross-roads or phases of development. All aspects were commented on, from technical problems to thoughts on process.

A short summary of the process and the major conclusions drawn from the process, can be found in section 7.2.
The diary entries were given headings on writing up the research (in the interests of clarity), and sections already covered in detail in 7.2 are omitted, but are otherwise as written, in the first person.

1995
Feb-Jun Development of idea, and technical research
(see also section 7.2.2)
What am I starting from?
Experience of photography and film-making incl. sound editing. Artwork using domestic objects. Had used Authorware multimedia authoring package, Photoshop and sound editing software. Access to computer and software. University photo studios, video camera, sound facilities, technicians. Email and telephone. Determined not to let the fact that I may not have immediate access to certain things confine my ideas too much. If I know that things *can* be done then I could find out how later.

I don't get ideas sitting at a computer. I have to have a pencil (pen won't do) and paper, computers can't do doodling, even if it is just words on the page, their position, angle size and style relate to each other (Figure 66). So not much writing for this. Tea table also has to be sketches (Figure 67 and Figure 68). Sketches link the physical position of people with the ideas. Can be non-linear, I keep 'going round the table' and adding things on the peripheries. I have to sketch in wires, which are also like mental links between people? Like a cartoon of relationships? Cartoon as in painting and as in Tom and Jerry. Artists notebook not common in photography, but contact sheets are. Computer is like a scrapbook I suppose but I still can't use it as such, not immediate enough, also not always in the right place. May do later when collect digital images.

Don't know how to some of the things technically, but have seen them done elsewhere, so they must be possible! But need to know how, how expensive; there is no published material in Britain on how to do this with Mac computers, so it is a case of talking to lots of people. The problem is how to get the multimedia authoring programme (Authorware) to understand and respond to pressure switches etc. Authorware can understand keyboard presses and mouse clicks, but any other input would need some software specially written — and I can't write software code!

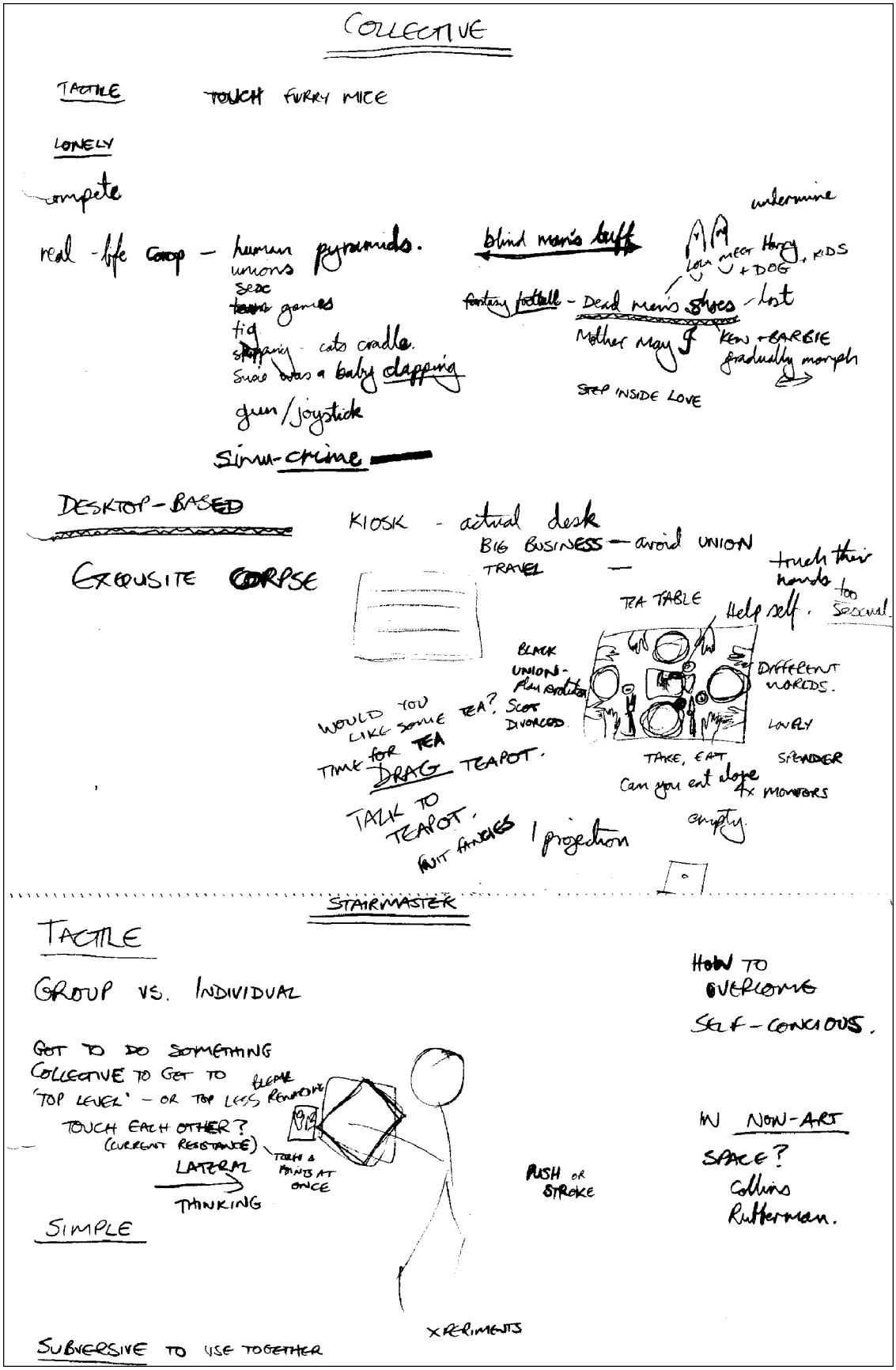


Figure 66: Development sketches of ideas for artwork.

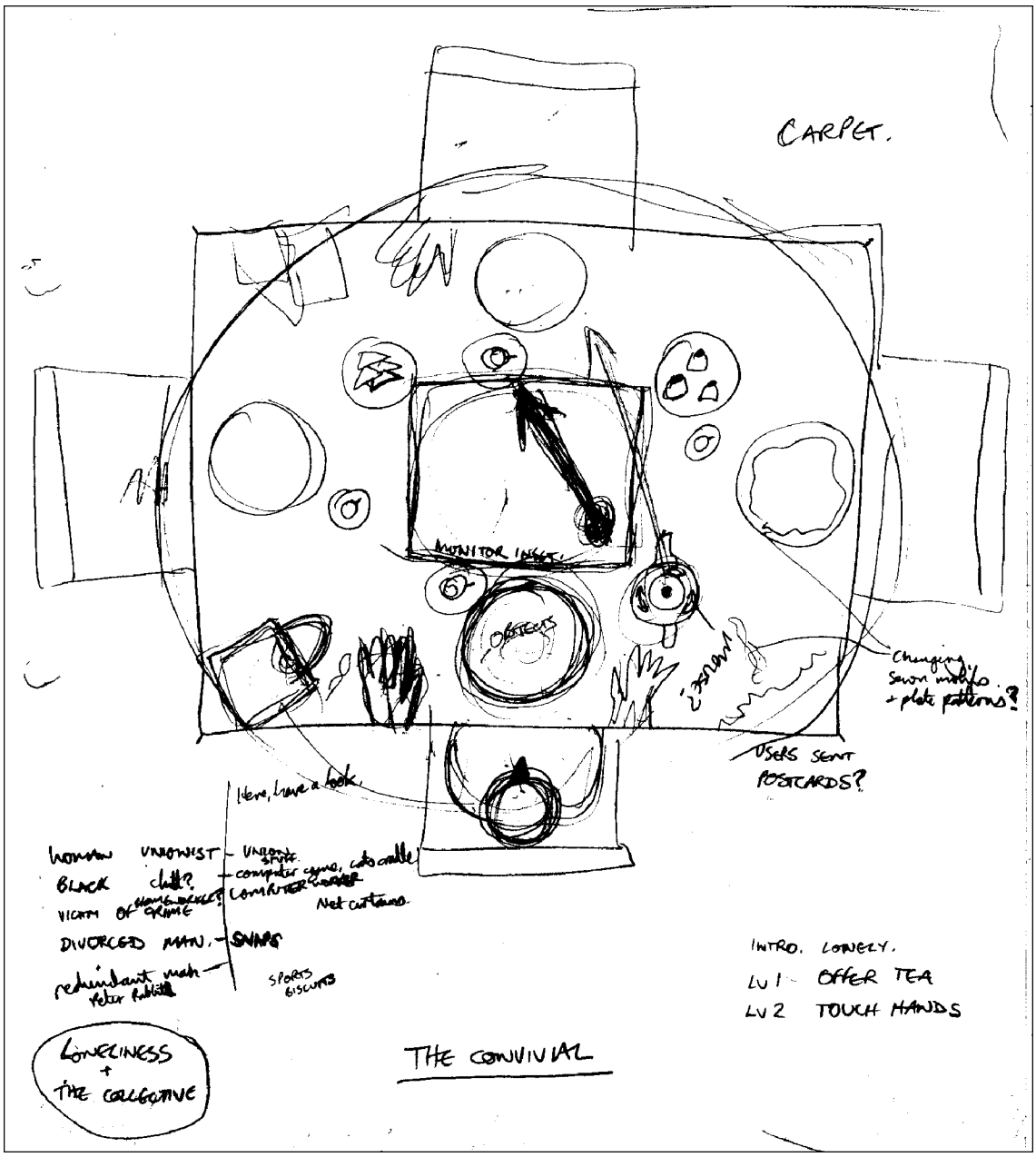


Figure 67: Development sketch 2 for tea table.

Some kind of pressure switches on chairs. But then how to trigger the characters to reveal things — rewards for co-operative behaviour. Join/touch hands? too intimate. Touchscreen to 'drag' image of a teapot to people, but people might need instructions. Teapot itself, then could point at people — difficult to pour tea for yourself, so need to co-operate. Movement sensor? Continue research.

13 Jun Installation Test: Testing LCD video projector:
(All 'installation tests' are set up in available empty office space rooms in Learning Development Services building. Blank spaces with 10 ft. ceilings.)
Present: Beryl Graham

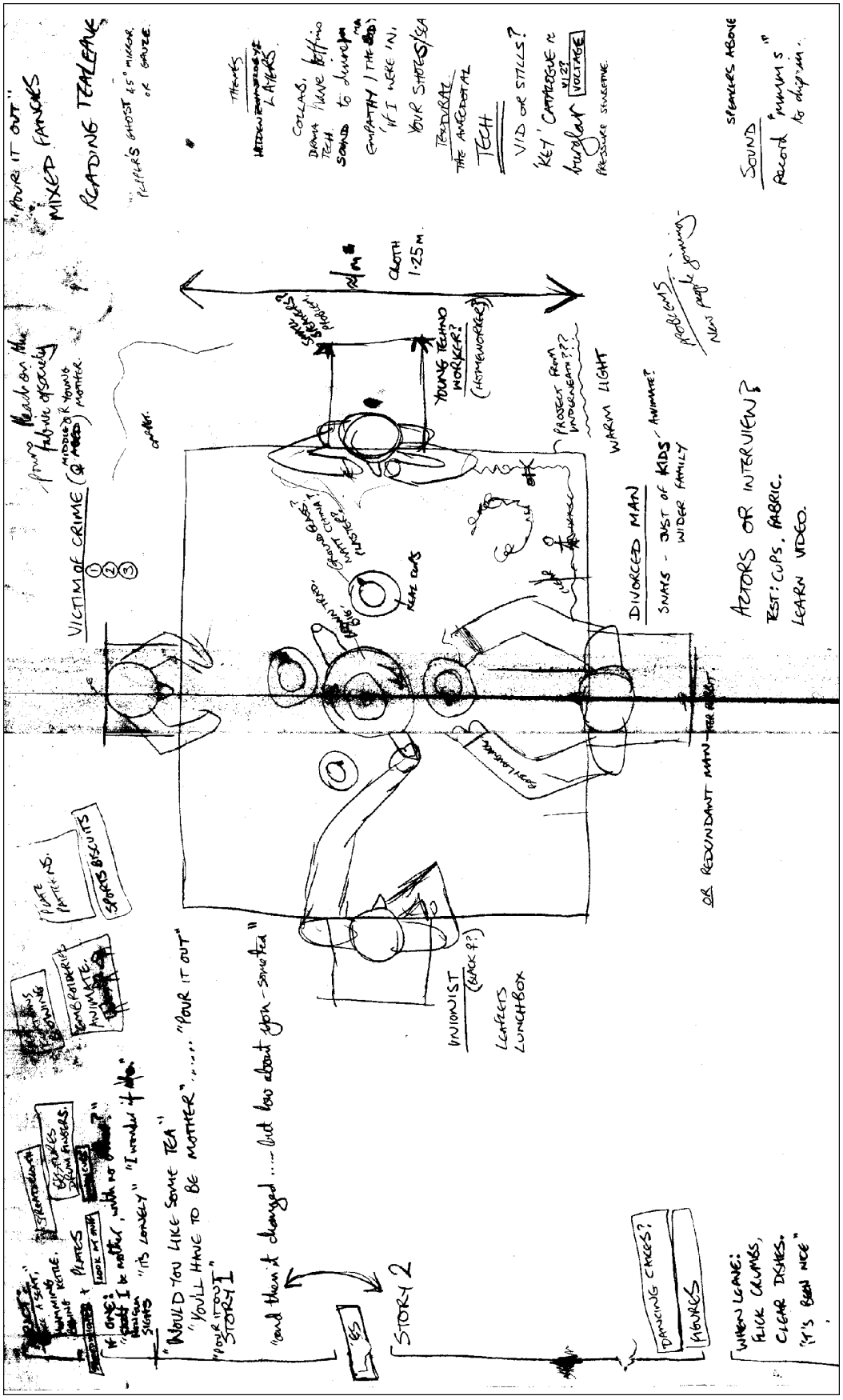


Figure 68: Development sketch 3 for tea table.

State of the work: No programme yet, just use odd Photoshop images including flesh tones. LCD video projector borrowed from School of Engineering; Sharp XG-38000E with 100-160 zoom lens. Try projecting it onto standard projection screen, cloth, ceramics and other surfaces.

Findings:
Room needs to be almost completely dark — it is much dimmer than slide projector.
Size: 1m diameter 3m away. Depth of field about 1 ft
The image is made of round dots (about 6 per cm). Like needle point, or very small marbles like those games to get marbles into holes. Resolution is OK on hands, objects like snaps would need to be at least 13 cm long on screen. Can't read the word "Photoshop" which is about 2 in long on screen. Image is considerably more contrasty than screen image. Highlights tend to burn out.
Projecting onto cloth darkens and lowers contrast slightly. The woven texture doesn't disrupt the image too much. Projecting onto white china cups caused some bright reflections but makes interesting 'moiré type patterns'. Reflections on plates may be problem. Colours look more cold than screen: use warm skin tones to attract people. But can adjust on projector.

Reflected light makes enough light around the screen to move around the room by. If wanted to project downwards could use shelves to support, but need to use mirror (front-silvered?)

Is this materials science research? Is light a material? The aesthetics of data projection don't seem to be explored much, merely used as 'the default option' for computer-based work, I've only seen it used on 2D surfaces. CRT data projectors have a smooth non-dotty image, but are not portable (or available) but prefer dotted image anyway (or am I making a virtue of necessity?) Glad I tested the medium first, it is exciting, getting 'hands on'. Unexpected facets of it like moiré patterns.

Jul-Aug Authorware programming v.1
Use Authorware because I know how to use it (for educational software- need some different things for art? animation- could import Director animations if necessary?) Director is more filmic, but more difficult to programme the interaction.
Some projectors only cope with standard screen size (640x480 pixels) so use that size, tho' definition is lower.
Despite having used the programme before, progress seems slow, but can experiment with basic structure of four-way interaction. The programme seems capable of all that I want to do.

10 Sep Take photos of cakes, cloth etc.
Take test shots of hands, cakes and tablecloth with a Quicktake digital camera. OK for hands in sunshine outside, but needs a lot of light, and the flash is on-camera and crude. Can't focus down close enough for cakes. So, use a 35mm camera and have the whole film put onto Kodak PhotoCD commercially. Cakes are French Fancies, Tunnock's teacakes, Jammy Dodgers, Mallows.

12 Sep Authorware programming v.2
Edit images in Photoshop and put some into Authorware as samples.

13 Sep Installation Test: Testing a prototype projected downwards onto table.
Present: Beryl Graham, Brian Thompson, also Carol Baker (photography PhD student).
State of the work: The images projected were a prototype of the actual programme, with some dissolve animations of hands, tea pouring and some soundtrack (v.2). The tablecloth and hands are quick test shots. The actions were triggered by mouse clicks rather than the external sensors. Projector 205 cm above ground, mirror at 45° 1.5 ft from lens, suspended on wires. Image size 90 cm square on rough cardboard table top. Although theoretically the mirror should be front silvered to avoid double image, an ordinary back-silvered mirror seemed to work fine.

Findings:
Mans hands size OK, life-size. Table top about 1m square. Tea should be darker. Nice pattern on teapot caused by rounded shape. If people don't get the fact that they should rotate the teapot perhaps arrows could flash onto it to attract their attention.
Carol says it's a bit like a seance — being around a table, in the dark, maybe should read tea leaves! Surprisingly atmospheric/intimate in an office room. The 'pool of light' comforting/attractive. People stroke cloth a lot- ensure it is a good texture.

15 Sep - Authorware programming v.3
Edit images to better quality, and input into Authorware. Editing is fiddly but all images need exactly white backgrounds in order to be 'transparent'. Experiment with voices, need to decide characters at the table.

20 Sep - Scripts v.1
Scripts will be very important carry much weight of communication — do I need a script advisor? The script in *Indigestion* was written by someone specialist. Voices should match the intimate atmosphere. Should be shorter than *Indigestion*.
Enquire with head of drama at Sunderland, Greta Archer re any interested drama people who may be able to advise.
Draft rough script ideas for the four chosen characters. How to get over that much information? One part outline problem, then next part how the character has tried to challenge that some way by collective action.

> Character Scripts, Sep 95
> **Divorced father: (Scottish)**
> Sometimes its painful with the kids, but I'm buggered if I'm going to just piss off like my Da. It's just a bit sad, because I canna even fit them in my flat, sometimes I think they feel a bit sorry for me, and I don't have any friends with kids. My boss started to get a bit funny because I couldn't work weekends.
> *Objects: family snaps, cigarettes*
> They're lovely kids mind. And funny, it was this guy at work who asked me if weekends were difficult because of kids, and then a few weeks later he said to come down the pool with his. I had sweaty palms, it was like a date cos I was worried his kids wouldn't like me, but it was fine. And we had a great crack. I'd always thought he was a bit of a wanker. They make you do things, I did pottery the other day, looks like it would fall apart doesn't it, but it didn't!
> *Objects: pottery, ?*
> **Unionist: (Cypriot or Asian)**
> This is what I make, I do the all the seams and its 70p a dress, but it takes about 20 minutes. Working at home it's not like you can really do it if the kids are

around, but I stay up late, and in the winter it's nice not to have to go out in the dark. It's not very safe round here.
Objects: dress parts, nappy
So I said to the man, Zarina downstairs gets more than that and that's just for crackers like, and he seemed really angry that we'd talked to each other, so I thought then it must have been a good idea! At first we just got together all of us who worked for the same factory, and it took about a couple of years and some help from the Trades Council but now it's like proper union and it's funny how the rates have gone up! We don't get out that much but we all know each other. It's like we watch out for each other at home too, for burglaries and that. I can see Dilbahar's window from here.
Objects: rights leaflets (in Urdu?), barfi
Victim of Crime: (geordie? too stereotyped?)
Well, I knew it was getting worse round here for burglaries but it was just such a shock to see the kid's stuff all over the place, that's what really hurt. It seemed to happen to every one, old Della next door came out of hospital and she'd been done, I think it killed her. There was this lad hanging around the door and I jumped out and screamed at him enough to shrivel him up. Turns out he was a Bettaware salesman poor little sod! Its terrible what it does to you, I'd have to plan it like, before I went out, so I could face it.
Objects: window locks, victim support.
So eventually I thought, it's me who's in prison not them bastards, I'm going out, so I did and ...
Objects: leaflets for community events?
Computer worker: (home counties):
Great job, love it, gives me real kick to sort out the software problems. I suppose I did spend a lot of time at work, but I did windsurfing ... and mountain biking ... and skiing. Fell over the stupid ski-pole, it's a small flat, great flat. But my friends, its like I looked up and they'd all moved on. But I like being independent, so when I broke my leg it was a bit of a shock, I couldn't get my socks on, stupid things like that ... Didn't have a clue who my neighbours were. Everyone was busy. Nobody from work wanted to be away long enough to get the knife in their back.
Objects: flash car keys/alarm, laptop?
Anyway, I had to ask the woman on the ground floor to help me get up the stairs, and she was pretty decent about it. I've never had much in common with my brother, his place is a dump, but he could put socks on OK. I was so bored I helped his daughter with her computer. She said there's a club at the school. I might help there too, if I don't get my car pinched, it's that kind of school.
Objects: Thankyou card.

9 Oct First meeting with drama students.
Greta Archer suggested a possible way forward. Students can opt for a cross-media module and I could teach the project module. Meet students and present lecture. six students interested. Decide to proceed with this, and encourage improvisation by the students of their own characters for the table, which might inform my scripts.

18 Oct Scripts v.2
Could have more character development if 3 monologues, will this be too complex? I want some depth to this- many of the works I see for *Serious Games* are very

shallow, a short amusement, no power to move. I want some depth to be there if people want it.

Character Scripts 18 Oct 95
1 monologue
2 problems
3 ask others

Divorced father: (Scottish)
I don't know if they look forward to weekends or what, but I'm buggered if I'm going to just piss off completely like my Da.
Objects: family snaps,
My boss started to get a bit funny because I couldn't work weekends. Sometimes I think they feel a bit sorry for me, think I don't have any friends because I don't know any with kids. I have got friends, but a lot of them are married and that.
Objects: cigarettes
They're lovely kids mind. And funny, it was this guy at work who asked me if weekends were difficult because of kids, and then a few weeks later he said to come down the pool with his. I had sweaty palms, it was like a date cos I was worried his kids wouldn't like me, but it was fine. And we had a great crack. I'd always thought he was a bit of a wanker. They make you do things, I did pottery the other day, looks like it would fall apart doesn't it, but it didn't!
Objects: pottery, ?

Unionist: (Cypriot or Asian)
This is what I make, I do the all the seams and its 70p a dress, but it takes about 20 minutes. Working at home it's not like you can really do it if the kids are around, but I stay up late, and in the winter it's nice not to have to go out in the dark. It's not very safe round here.
Objects: dress parts, nappy
So I said to the man, Zarina downstairs gets more than that and that's just for crackers like, and he seemed really angry that we'd talked to each other, so I thought then it must have been a good idea! At first we just got together all of us who worked for the same factory, and it took about a couple of years and some help from the Trades Council but now it's like proper union and it's funny how the rates have gone up!
Objects: dress parts, leaflets
We don't get out that much but we all know each other. It's like we watch out for each other at home too, for burglaries and that. I can see Dilbahar's window from here, can you see?
Objects: rights leaflets (in Urdu?), barfi

Victim of Crime: (geordie? too stereotyped?)
Well, I knew it was getting worse round here for burglaries but it was just such a shock to see the kid's stuff all over the place, that's what really hurt. It seemed to happen to every one, old Della next door came out of hospital and she'd been done, I think it killed her.
Objects: incident number form.
There was this lad hanging around the door and I jumped out and screamed at him enough to shrivel him up. Turns out he was a Bettaware salesman poor little sod! Its terrible what it does to you.
Objects: window locks, victim support.
So eventually I thought, it's me who's in prison not them bastards, I'm going out, so I did and I can't say I wasn't frightened but if you don't do it they've won haven't they?

Objects: leaflets for community events?

Computer worker: (home counties):

Gives me independence. Great job, love it, gives me real kick to sort out the software problems. I suppose I did spend a lot of time at work, but I did windsurfing ... and mountain biking ... and skiing. Fell over the stupid ski-pole, it's a small flat, great flat.

Objects: flash car keys/alarm,?

But my friends, its like I looked up and they'd all moved on. But I like being independent, so when I broke my leg it was a bit of a shock, I couldn't get my socks on, stupid things like that ... Didn't have a clue who my neighbours were. Everyone was busy. Nobody from work wanted to be away long enough to get the knife in their back.

Objects: mobile phone?

Had to ask the woman on the ground floor to help me get up the stairs, she was pretty decent about it. I've never had much in common with my brother, his place is a dump, but he could put socks on OK. I was so bored I helped his daughter with her computer. She said there's a club at the school. I might help there too, if I don't get my car pinched, it's that kind of school. Ever do that?

Objects: Thankyou card.

19 Oct Installation Test: Testing improved prototype.

Present: Beryl Graham, Huw Davies, Brian Thompson, also Beverley (Learning Development Services).

State of the artwork: The prototype comprised test images of hands with dissolve animation, with soundtrack of one of the 'characters' — a divorced father (v.3). His hands look through family snaps. I triggered the responses when people sat on the chair etc. for a rough approximation of what would happen.

Findings: The pacing of the monologues seems good — about 15 seconds each. Would live action hands be better than animation? General response no, like slowness, makes you look at each 'slide'. However, the speed of dissolves is difficult to control in Authorware 1.7 do I need to use Director?

Huw says: Is it like 'looking over someone's (the character's) shoulder' or is it like *being* them? Identification, alienation? Having the hands look at the snaps rather than show them to the other places at the table has strong meaning. Inward looking rather than outward — this could change.

Brian asks if the characters are always the same for each place — does the viewer have any control over who appears? I had considered that, but it would need more button pressing, and becomes simplistic. Is it weird for men to get a female character? Women are perhaps more used to identifying with men than vice versa. We joked about having a sensor which identified whether a male or female bottom was sitting on the chair!

Toward the end of the meeting we sat around the table eating actual biscuits. It seems like a comfortable, welcoming interface, even in the dark.

Beverley dropped in after the meeting. She asked if the characters ever referred to each other's problems rather than talking about their own. Good point, perhaps have them refer to 1 other problem in final monologue?

People who have never seen it before seem to have very useful comments: In future try to have someone who hasn't seen it before at each test meeting?

Now I get nervous when I have to show this work to people, the characters are my creating and I want people to like them. It's getting quite personal — find myself fleeing to the technical research as less challenging.

23 Oct Drama students, improvisation
13 Nov Drama students, recording first versions.
Students first improvise from objects I have brought, then start to develop their own characters: homeless girl, anorexic girl, alcoholic father, computer worker, childless woman, child with new brother, prisoner. Characters are inventive but their monologues mostly straight descriptive. Convinces me that more poetic approach is needed for tea table. The sessions are fun and sociable, and the students have some interesting life experiences, but somehow this may not be useful. I was hoping for some insights into dramatic structures, but they don't seem to have much theatrical theory overview.
Improvisation is useful- like going round and round an object (not linear) and reworking it. Word processing great for reworking- how did I ever write in a linear way? Is the tea table my object or is the programme my object? programme easier to rework than the chairs and table when made, so rework objects by sketching- leave construction till later.

18 Nov Scripts v.3 Search for actors.
These really need refining. Much shorter. After studying *Indigestion*, decide to have characters mirror each other in style and repeating motifs of speech. (*Indigestion* has repeated metaphor of food). Also as per Beverley's and Huw's suggestions, make each final monologue more open and reflexive to other characters.

Finding the right voices important- friends of friends who have done amateur acting. Need real voices. Meet various people for tea.

Character Scripts, 18 Nov 95
1 monologue
2 problems
3 ask others

Divorced father: (Scottish)
It's like trying to squash a week's feelings into a weekend. It's like I'm trying to make up for divorce by forcing ice cream down them. It's like trying to shoehorn a family into my bedsit.
Objects: family snaps,
I always thought that this guy at work was a bit of a wanker, a wet weekend. But found out he was a weekend dad too and he said to come down the pool with his. I had sweaty palms, it was like a date! *Objects: cigarettes*
Now we crack on so much the kids call us wifies, but they swap stories too about their weekend dads. Kids make you do things though, I did pottery the other day... looks like it would fall apart doesn't it?
Objects: pottery, ?

Unionist: (Cypriot or Asian)
It's like having a factory in your home, only with kids. It's like you can just ignore the muggers and the rain outside. It's like the rest of the world washed away sometimes and you're up here in the sky.
Objects: dress parts, nappy
I always thought that we couldn't have a union, that it would always be pin money. But I said to the man, my sister gets more than that, and he was so angry that I knew it was good idea! We got together slowly, the Council

helped, but now it's like a proper union and it's funny how the rates have gone up!
Objects: dress parts, leaflets
Now we only visit each other sometimes but we all know each other. We watch out for each other at home too, for burglaries and that, I can see Dilbahar's window from here. Working at home you have to be organised don't you?
Objects: rights leaflets (in Urdu?), barfi
Victim of Crime: (geordie? too stereotyped?)
It was like all splinters, kids toys gone too. It was like everyone got burgled; when old Della next door came out of hospital and she'd been done, I think it killed her. Its like you suspect everyone.
Objects: incident number form.
I always thought that I'd cope with it but it gets to you. There was this lad hanging around the door and I jumped out and screamed at him like to shrivel him up. Turns out he was a Bettaware salesman poor little sod!
Objects: window locks, victim support.
Now, its not like I'm not frightened, but I do go out. The more canny ones you meet the more you realise its only one or two that're baduns. But if you don't do it they've won haven't they?
Objects: leaflets for community events?
Computer worker: (home counties):
It's like heaven, no commuting, great flat to work in. It's like total independence working when you want — which is most of the time. It's like being in touch with the whole world when you're on the net.
Objects: laptop? flash car keys/alarm,?
I always thought that they sent someone round if you break your leg; couldn't get my socks on, stupid things like that. But my friends, well, not much time ... didn't have a clue who my neighbours were. Wasn't like I had workmates.
Objects: mobile phone?
Now, I know that my brother can put socks on pretty well. Never had much in common with him, his place is a dump, but I was so bored I helped his kid with her computer. She made me say that I'd help at her school computer club ... ever do something like that?
Objects: Thankyou card.

21 Nov Soldering switches. Sound consultant Paul Graham
During last 3 months extensive research on how to connect this programme to external sensors, so that it can tell if someone sits in a chair, and if tea is 'poured':

Eric Fletcher CIS x2798 does external switches but on for PC, on Macs probably use Apple desktop bus 6 pins. Tom Cullen, audio-visual technician, come over for dinner, you could use 4 mouse click buttons but then would need multi-connector.
I put a request for help on the Authorware discussion group and they suggest an X10 DLL or maybe xcmd as I don't have a clue what this is I email for further information and they won't reply.
I post an enquiry on the web page of Hub, and Richard Gooderick replies: try the artist Sarah Chesters Thompson. She had a pet boffin to programme x commands. "Basic Stamp" from USA includes a PIC Chip but needs to be programmed on a PC, has 8, 16 or 32 i/o. If no pet boffin then suggests attaching sensors to keyboard keys but doesn't know how.

Artist Susan Collins says she uses Amigas, but try Nick Dalton at Bartlett who knows of a cheap sensor input device, I email him. He doesn't reply.
I call Tessa Elliot, an artist at Middlesex University who I knew before and her colleague Hugh Malinder 0181 362 5109 replies: Bingo!: Dismantle keyboard, solder to silver spots on green board. Connect to 'momentary make' switch lead up to 10 ft. depending on electronic disturbance, try Maplin for switches. OR connect devices to serial port.

I don't want to get too much into programming- seems a dangerous syndrome when artists get so wound up in programming they lose sight of real life! But this networking is fun. Sociable. Decide to use simple switches. Teapot could use mechanical device (Figure 69 and Figure 70).

Soldering: John Sheil x4776 rm. c25 Priestman has soldering equipment, use low voltage soldering iron. The switches I was sold as 'momentary make' are not in fact, but solder one on anyway. It works! This means that if someone sits on it will be firing of all the time, slowing down processing of the computer. Need just one pulse when triggered, (and then one when get up from seat).

Sound output problems:
Sound Paul Graham Sound/Radio technician at Sunderland. We go for a coffee. Very helpful and friendly, digs out some chairs from storage too.

How to have sound going to 4 different sets of speakers when there is only 2 sound channels?: Computer splitting too complicated. Much simpler to do it mechanically: when teapot pointing, speakers of that chair only turned on. Could have one general speaker also if chair speakers not clear enough. Need amp (domestic?)
What kind of speakers in chairs? Try Walkman speakers. at least 50 ohms, 80hz-12(or 10) KHz . 5 watts RMS. Public safety re power in speaker cables?: negligible.

Dec Authorware programming v.4
Structure sequential sound monologues.

1996
15 Jan Authorware programming v.5
Experiment with animation of hand images.

15 Jan Drama students, recording voices onto computer. Record.
Students record their selected characters straight onto the computer, and also some make recordings from my scripts, but their voices are really too young.

17 Jan Scripts v.4
Further stylise so all sentences follow pattern. Will need also odd comments and general encouraging phrase to suggest audience should speak.

Individual Fancies: Character Scripts 17 Jan 96
1 hesitant monologue
2 problems/ solutions
3 more confident, open, ask others
Divorced father: (Scottish)

It's like trying to squash a week's relationship into a weekend. It's like I'm trying to make up for divorce by forcing ice cream down them. It's like trying to shoehorn a whole family into my poky wee bedsit.
Objects: family snaps
I always thought that this guy at work was a bit of a wanker, a real wet weekend. I always thought that I was the only weekend father but he said to come down the pool with his two. I always thought that you only got sweaty palms on a date; what if his kids didn't like me.
Objects: cigarettes
Now we crack on so much the kids call us wifies, but they swap stories too, maybe about their part-time dads. Now they make me do things, those kids, we did pottery with them the other day... looks like it would fall apart doesn't it? But it didn't.
Objects: pottery
Cake: Tunnocks Teacakes
Unionist: (Cypriot or Asian)
It's like having a sewing factory in your flat, only with kids, so I do it mostly when they're asleep. It's like sometimes you can just ignore the muggers and the rain outside. It's like the rest of the world washed away sometime and you're up here alone in the sky.
Objects: dress parts, toy
I always thought that we couldn't have a union, that it would always be just pin money. I always thought you couldn't pin them down but we got help from the council, got together a little at a time in these flats. I always thought they'd just sack you, but now it's like a proper union and we've just got holiday pay!
Objects: leaflets
Now, we don't meet very often but the meetings make a big difference. Now, we watch out for each other at home too, for burglaries and that, I can see Dilbahar's window from here. Now, working at home you've got to be organised don't you?
Objects: barfi
Cake: Barfi/ mallows
Victim of Crime: (geordie?)
It was like everything was splinters, kids toys gone too. It was like everyone got burgled; when old Della next door came out of hospital and she'd been done, I think it killed her. Its like you suspect everyone.
Objects: incident number form.
I always thought I was quiet but when this lad hung around the door I jumped out and screamed at him like I was crackers. I always thought I was a good judge of character but turns out he was a Bettaware salesman poor little sod! I always thought nosy neighbours were a pain but not now.
Objects: window locks, victim support.
Now, its not like I'm not frightened, but I do go out and even help at a youth club. Now, the more canny ones you meet the more you realise its only one or two that're baduns. Now I'm determined because if you don't do something they've won haven't they?
Objects: leaflets for community events?
Cake: *Jammy Dodger*
Computer worker: (home counties):

It's like heaven, no commuting, great flat to work in, great view. It's like total independence; working when you want — which is most of the time! It's like touching the whole world when you're on the net.
Objects: laptop?
I always thought that they sent someone round to help if you break your leg. I always thought there'd someone to help you get your socks on but my friends, well, not much time ... didn't have a clue who my neighbours were. I always thought that not having colleagues and family hassling you would be great.
Objects: mobile phone, flash car keys?
Now, I know that my brother can put socks on pretty well. Now, I think I have a bit more in common with him, though his place is a dump, but I was so bored I helped his kid with her computer. Now, she's made me say that I'd help at her school computer club ... ever do something like that?
Objects: Thankyou card.
Cake: Individual Fancies
All: How about you. Sigh, sniff, would you like some tea, yes please hello? thank you.

20 Jan Record voice of divorced father, and Asian homeworker
Make recordings with the two found actors with portable tape recorder. Anjali voice of Asian homeworker is a bit echoey from the room.

22 Jan Drama students, take pictures of hands.
Use Quicktake and flash to record student's hands for their characters, and also modelling for my characters.

24 Jan Authorware programming v.6
Include recorded voices, and some hand shots.

25 Jan Installation Test: Testing improved prototype.
Present: Beryl Graham, Brian Thompson, Huw Davies, Deborah Thomas.
State of the work: Improved programme with some voices and hand images. Projected onto table, responses triggered by hand.

Findings:
Deborah: Thought that it might be intimidating especially for lonely people, but thought it avoided that problem. Characters established enough in short monologues for the point to be made.

12 Feb Drama students: criticism session
Characters were discussed, images and sounds edited, and how their work would be presented to their lecturers discussed. For me, the project hasn't been very useful thus far, as they lack expertise at scripting, and seem resistant to rewriting and reworking characters.

12 Feb Authorware programming v.7
Programming 'the voice of the table', to give helpful hints.

15 Feb Sound studio recording session
Anjali's recording not good enough, the four voices need to match, so book into proper recording studio for Asian homeworker, computer worker, and victim of crime.

Feb Editing sound files.
These recordings good. Edit for sense and length.

21 Feb Retake pictures of hands
Previous shots of hands disappointing. The digital camera seems to flatten and they seem unsharp. Retake with more contrasty lighting for more sharpness.

Mar/Apr Editing hand images
Decide to keep the shadows of the hands in the image, because the light from the projector also cast sharp shadows. This works very well to make the hands seem 'real"

April Objects construction
Teapot construction made (rocker rotating circle) and a test chair switch. This is rather noisy when the lever rollers on the switches go past the flap. Rearrange so that flap presses rather than passes. Seems to work , albeit rather Heath Robinson.

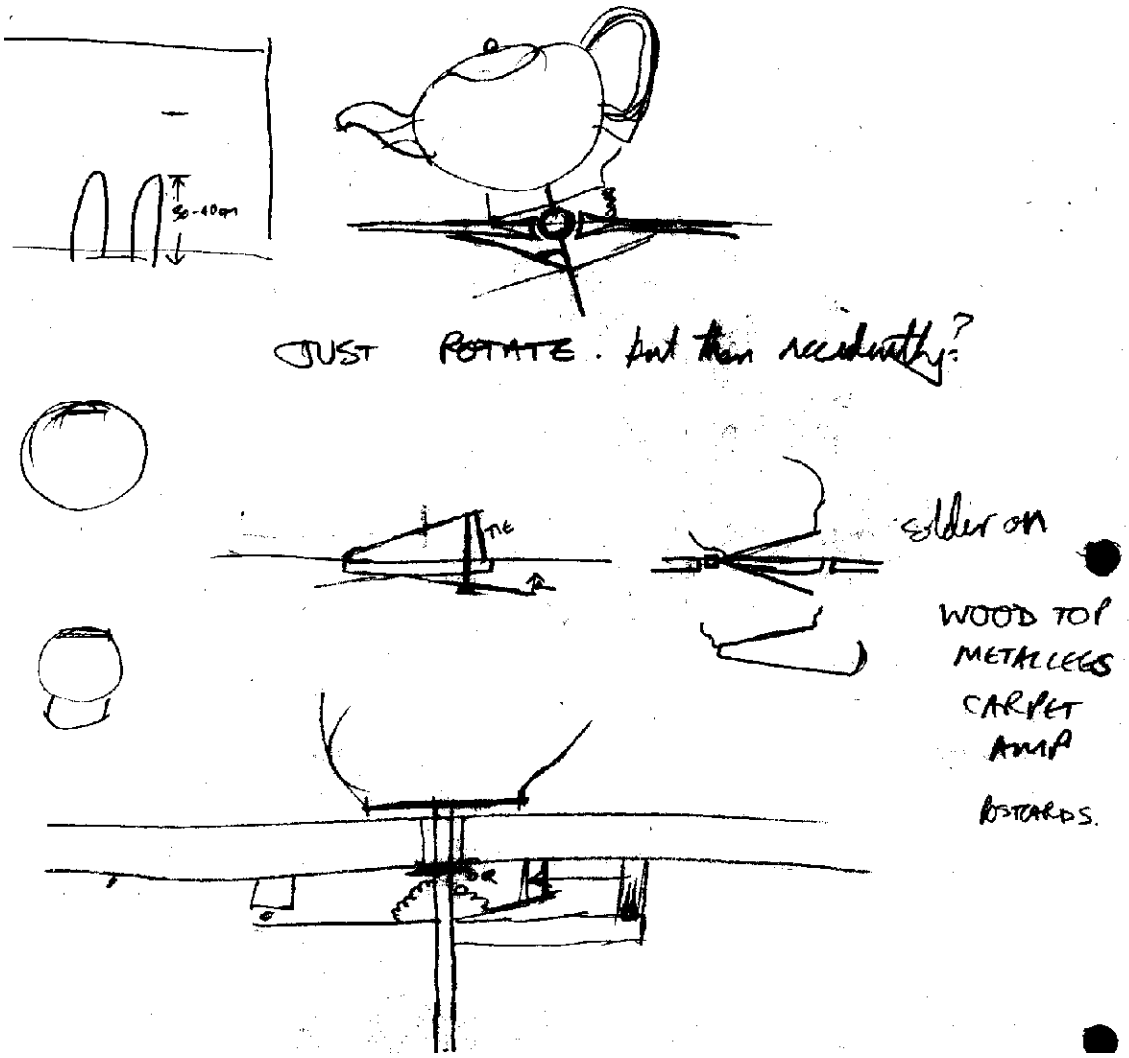


Figure 69: Early teapot ideas sketch.

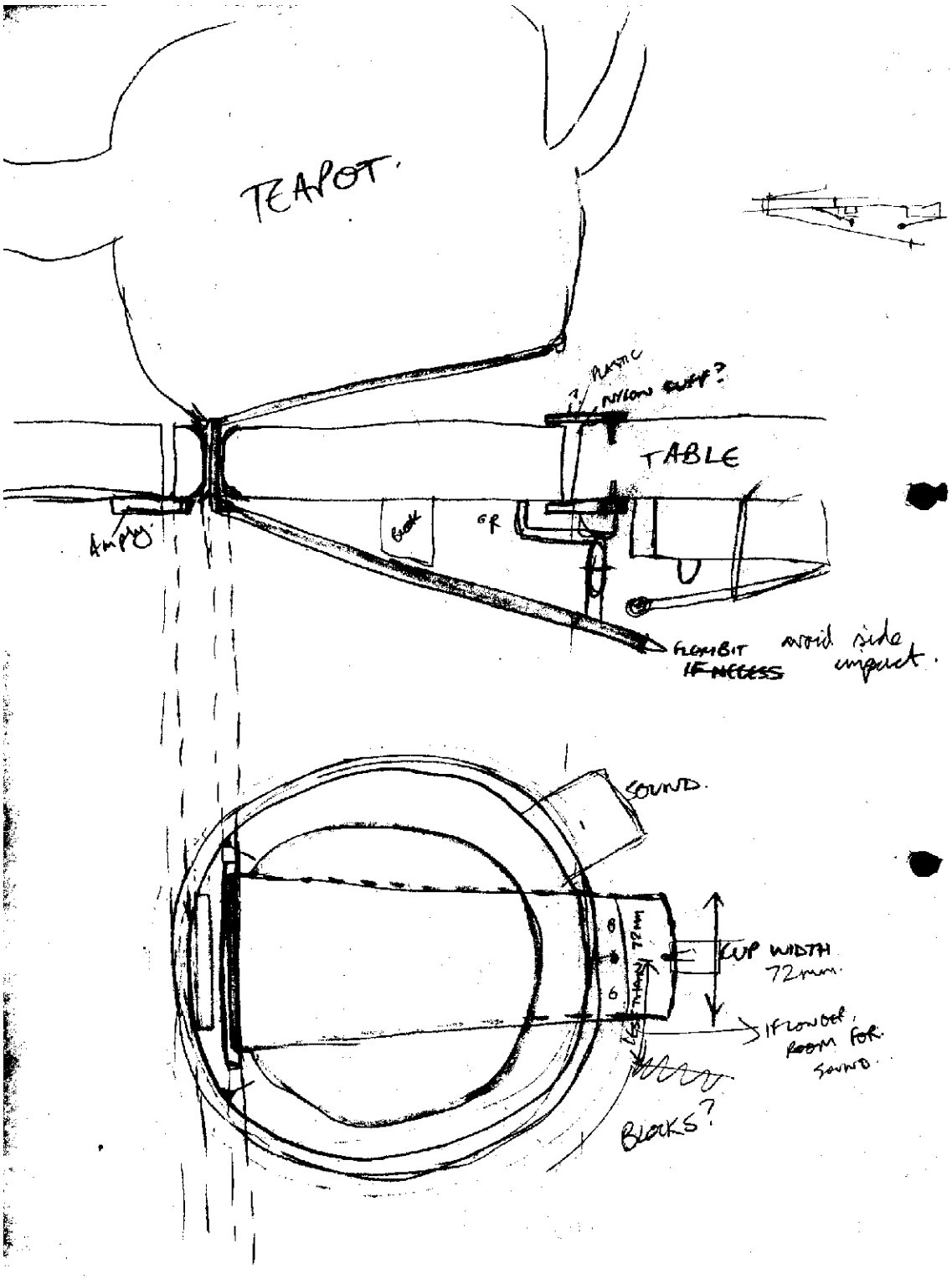


Figure 70: Sketch for final version of mechanical teapot.

April Authorware programming v.8
Inserting remaining hands and voices.

25 Apr Installation Test: Testing improved prototype with chair and teapot Plus students' work.

Present for students' work: Students: Nick Barnet, Louise Corbett, Gillian Hope, Jo Kehoe, Graham Pearson, Helena Rock. Guests: Greta Archer, Maggie Tate, plus other CAS students.
State of the work: Chair and teapot switches working to trigger programme (one intermittent fault.) All characters working.

Findings: Students decided that an introduction was needed, so one student acted as a 'waitress' to bring people into the room, and say 'please take a seat'. Guests figured out how to use the teapot. Responses varied: users didn't engage in conversation between themselves (too busy asking questions of the students) but seemed too intimidated. Criticisms were that the whole set up was frightening because it was dark, and that the characters were slightly too simplistic with their happy endings. Interesting to see it done as 'a performance', but not sure if that makes people more self-conscious or less, as people stand around as human witnesses, and maybe it is more like cringey 'audience participation'. Maybe computers always lose out against real human performers. These students shatter the usual quiet of the multimedia production at Learning Development Services, and complaints are made about the students drinking staff tea!

Present for *Individual Fancies*: Brian Thompson and daughter.
State of the work: All characters there, switches work on teapot and chairs.
Findings: Switches etc. worked OK, but slightly cumbersome and noisy (add felt to dampen noise). Brian's daughter (about 12 years old?) was impressed with the 'magic' of it. People tend to think the image is coming from the table, because of the mirror disguising the source of the light- don't know if they would if they could see the lens pointing straight down. Maybe the 'magic' is impressive or frightening, depending on your state of mind? Cups are a bit too tall for the comfortable operation of the teapot. Biggest problem is that people don't seem to talk between themselves when the characters have finished. They really need more encouragement- maybe more obvious hints — maybe all rewards on the table stop so it is not distracting?

May Authorware programming v.9
Change ending monologues: characters all say 'how about you' and keep repeating that if they have tea poured. Plus the 'table' gives hints like "you, real people".

25 Jun Installation Test: Testing improved prototype. Video documentation.
Present: Huw Davies, Sally Taffs, Steve (Multimedia programmer), Andrea (LDS reception)
State of the work: This is the most 'real' installation to date, and is a test of how the work would be installed in an exhibition space. The office shelves are draped with sheets, and otherwise cleared. The projector is on a projecting plank, so that all four chairs are accessible. The programme is 'finished'.

Findings: Most of this day was recorded on video. Video documentation for publicity purposes was made with me, Sally and Steve as 'actors', Plus the reactions of Huw and Andrea on trying to use the work plus discussions afterwards were recorded.

Huw is shown into the room as if it were a gallery space, and left to work it out. Although he knows things about the work already, he has problems: The voice encouraging to sit down is fine, but then he tries to 'pour tea' for empty chairs (which does not work) , and the voice hinting that someone else needs to sit down doesn't seem to help him for some seconds. But he eventually asks me to sit down. Then is OK, but he doesn't get that someone needs to be sitting in a place before tea can be poured for them. Teapot is slightly awkward which doesn't help.

Huw suggests getting someone who has never seen it before to come and test it. Andrea, receptionist for Learning Development Services, obliges. She is slightly intimidated, but likewise sits down quickly but is reluctant to ask someone else, until the hints get obvious. She talks a little when prompted, but mainly to ask questions about how it works.
In discussion afterwards Huw asks her if she thinks the characters have anything in common. She says that they all are moaning about something! Maybe the end monologues aren't positive enough? She seems amazed by the 'magic' of it and seems generally positive though.
This is like hosting a party- I want to help all the time but must stand back and just give people the 'tools'.

A very useful test: Watching the video gives lots of information. Decide to change the 'hints' from the 'voice of the table'. Now they are random, but they need to escalate in the obviousness of the hints I think, as time elapses. Need much more obvious hints that more than one person needs to sit down.

{VIDEO CLIP ON CD} 6: 25th June installation test

(gap for *Serious Games*)

1997

Jan- Improving objects

The experience of *Serious Games* impresses upon me the amount of hard use that installations get, and that the objects need refining and improving. The chair switches are made with firmer anchors of fixing blocks, and vibration-resistant washers. The teapot is reconsidered. It's is OK but clunky and a bit awkward. Is there any way the teapot could be free-moving and have sensors in cups? Magnetic switches have only a short range of operation. Ask advice from my Dad, Brother and Uncle Harold (who have some experience with electrical engineering)., when I see them at social events. Brother says proximity switches (but they are rather expensive and big. Harold says infra-red like TV remote control. They can work by reflecting off surfaces so could put transmitter and receiver in bottom of cup. Farnell's Components say would be better to have transmitter in teapot, could work off battery. So far switches are easy- they just make a circuit and simulate a key press — how does the receiving diode translate into circuit of the right voltage/amps whatever?? Eventually find helpful technician at Sunderland, Alan Flaws, he agrees, can make circuits for me. Wish I'd found him before.

Feb Authorware programming v.9

Improve hints from 'the voice of the table'. As per Installation test 25 June (people don't realise someone else has to sit down), also as per *Resonance of 4* Case Study, it seems very difficult to get people to interact- make it even more obvious!

More hints for someone else to sit, which now escalate in obviousness if no-one else sits (about every eight seconds):

Hints for some-one else sit down: in this order
How can I be mother .. with no other?
Tea for Two (sung)
Sigh
No-one to talk to, all by myself (whistled)
No-one to talk to, all by myself (sung)
How about them, over there, maybe they'd like a cup of tea.
Tea for one just doesn't work
It's a big pot of tea- you'll need to share it.
Don't be shy, the more the merrier.
You're not going to get very far by yourself.
You can't pour tea if there's no-one there.
You're going to have to ask somebody else.
Why don't you ask someone to join you, *anyone*.
I'm going to have to do it — hrm! Who wants to join this person for tea for two ... three ... four ..?

Hints to carry on the conversation:
(after each character has made three monologues and eaten a cake whilst saying something like 'So, what are you up to'/ 'How about you', the next time tea is poured for that character, they simply repeat that phrase, then 'the voice' of the table' gives hints in a stage whisper: These hints escalate in obviousness with each pouring, and each of the four characters has different hints.)
1st hints:
This is only a machine, how about you
Yes, you, *real* people
Machines can't listen, it's up to you
Go on, talk amongst yourselves.
2nd hints:
Go on real people, ask each other questions
I know it's a gallery, but you *are* allowed to talk.
Only real people have real conversations.
Have a cup of tea, have a chat!
3rd hints
Ask 'em what their favourite cake is.
Go on, ask them their name.
Try ask them where they're from.
Try ... do you come here often!
4th hints
If you were a cake, what kind of cake would you be?
They say we're on-line, but are we in touch?
Is it good to talk?
United we stand, divided we ... what?

Also, each character's cake plate gets an animation if that character and one other complete their monologues. (Jammy Dodgers heats beat, Mallows breathe in and out, French Fancies giggle and fidget, Tunnocks' Teacakes highland jig.) If all four characters complete, then two crinolined ladies on the tablecloth go and giggle with each other.

Mar-Apr Preparing for exhibition
Enquiries and proposals have been made over the past year for possible 'test exhibition' sites. Many galleries do not have the budget for hire of a video projector (Zone Gallery) or the structural necessities to suspend the projector (Laing Art Gallery). Other approaches were made (to *Pandaemonium* and *Video Positive* festivals) but rejected. Wanted real gallery, that would let me do case studies. Over a short period of time, the projector could be loaned by Sunderland University. The solution is provided by the Reg Vardy Gallery at Sunderland, with the offer of a short exhibition, for which I could make my own publicity. The problem is to attract a more general audience as well as University people. Didn't want a specialist art audience only. Decide to do direct mailing/delivering of flyers to houses and businesses nearby.

The development of the infra-red version of the teapot goes rather slowly — may not be ready for exhibition? Decide on infra-red emitter in teapot attached to a battery (a tilt switch lets the battery last longer by only activating the circuit when the pot is tilted.) A small infra-red receiver (3 mm diameter) in the bottom of each cup, these need to be connected to a circuit board which completes the circuits when 5V is reached, each circuit can then be connected to the wires attached to keyboard. Problems with circuits. Keep mechanical version as backup! Another set of cups/teapot/cloth are prepared, ceramic technician drill holes in spout and bottom of cups. The infra-red version would be less clunky, but would it affect the interaction? The mechanical teapot is difficult to pour for yourself, so might encourage pouring for other people.

Make suspended platform for projector. A sheet of chipboard, with holes/brackets for chair and table legs to keep chairs fixed in relation to table (not allowed to screw to gallery floor!). Get rug etc. etc.

Make invites, flyers, and posters. A5 flyer version (see Figure 71).

16 April Installing the artwork in the gallery

From 9.15 arriving with the equipment, takes 2 people (me and David (partner)) most of the day. Installing the work is mostly mechanical- making sure things are firmly fixed, in the right place, and functioning. Realise that the suspension platform covers up the infra-red sensor on the LCD projector, so that the remote control for zoom etc. won't work. So stick bits of silver foil at angles so that can use the remote control from the side by bouncing the light, rather than climbing ladder each time. Have to buy a Kit-Kat for the silver foil — how life imitates art!

Alan can't make it with the circuit to try the infra-red version of the teapot till 8 pm- gallery space is locked up at 9 pm. Very last minute — get it soldered up — doesn't work! No keyboard commands work at all. Some problem with the power supply? Don't know if we have blown the whole keyboard. Arrgh. Have to leave gallery space. Decide to just make a CD next time I think of interactive artwork.

17 April Exhibition and Case Study

Arrive at 7 am to try and get the mechanical teapot version working. Once the infra-red circuit is disconnected, fortunately the keyboard seems to work, but have to replace the long ADB cable (between keyboard and computer) with Heath

Figure 71: Poster/flyer for exhibit of *Individual Fancies*.

Robinson series of linked short ADB cables. Taping up sheets to cover these cables at 9:59. Open on time at 10 am, rather haggard. Would have liked to spend much more time on details of lighting etc.

However, the rest of the day goes very positively, surprised at the number of people who come — probably a majority of University-related people (from secretaries and canteen staff to administrators and lecturers, but also some 'real people'! Carol does the observation forms whilst I recover, count overall numbers, or help the odd person (these records omitted from the data).

Anecdotal notes from observation:

Jan (Ph.D. sculpture student) says it is like sitting in an old house and imagining the characters who would have inhabited it. As Carol also said it was like seance, is it scary for people I wonder?

Some ask me if the characters are interviews, so the actors must be pretty naturalistic.

Re: getting someone else to sit down if there is only one person sitting: During observation, someone else always sat down without having to be asked, so I don't know if people would have the courage to ask a stranger.

Even if people listen to the hints to sit down, a couple of people still ask the person at the desk "Is it OK to sit down?".

Carpet needs to be bigger, and lit with small spots, to give more of physical presence to the piece. Because if the table is full, the projection is obscured from a side view, and it looks like just a bunch of people sitting around a table — perhaps having a meeting, perhaps performance art? Anyhow scary and off-putting.

God knows how a party of 20 infant school (about 6 years old?) children turns up with their teachers. We take it in turns to use the table, and they seem absolutely gobsmacked but not scared — obviously have no conception of how it is done but take it for granted. Because they are so small, they *cannot* pour tea for themselves, so *have* to co-operate in pouring for each other. We end up having a chat about favourite cakes, and different accents.

People do seem more apprehensive than I would have thought, but on the other hand they do sit down, do the right things, and mostly interact with each other. The funny bits seem to help people relax, and give people a chance to make their first comment. The giggling crinoline ladies are corny but make people laugh. The best comment so far "It's Mad!" (a youthful term of approbation I believe M'lud).

{VIDEO CLIP ON CD} 7: *Individual Fancies* at Reg Vardy Gallery; demonstration of use 1.

{VIDEO CLIP ON CD} 8: *Individual Fancies* at Reg Vardy Gallery; demonstration of use 2.

Things to fix:

Odd glitches. Sporadically the switches either don't respond, or trigger the wrong thing to happen (i.e. F triggers G). Think this is either the ADB cable is too long and the signals are not strong enough, (but other keyboard works) or dodgy keyboard connections, or signals getting crossed because wires are now close together. Alan says that sometimes connections cause a power 'bounce' which could affect adjacent bits of the printed circuit in the keyboard. Need to research this.

Many try to pulls chairs out to sit down — have chairs further out? Cloth a bit shorter to give the impression of more room. The fixings seem firm enough but get a lot of yanking.

The 'tip me up and pour me out' message is maybe little slow to give the hint?

Some light stripes from the projection spill over the edge of the table and make white stripes on the carpet- maybe have dark patches on the carpet to mask this?

b) Methodologies for making the artwork: What is it that it is it like?

> 'knowing in action' — the sorts of knowledge we reveal in our intelligent action, publicly observable/physical performances and private operations ... spontaneous skilful execution... constructions... explicit, symbolic form from tacit , spontaneous intelligence ... dynamic quality.
> 'reflection-in-action'- constructionist's view ... thinking reshapes action while we are doing it ... improvisation, conversation.
> (Schön's concepts summarised by Gray and Pirie, 1995, p.13).

Whilst process analysis is not the main thrust of this research, some exploration of metaphors of the process was made, for the reasons outlined in 7.2.1, and to inform the research as a whole. The production of the artwork did not set out to keep to a certain methodology, but the method was set by need. As a hybrid, multimedia artform, computer-based interactive work is likely to cross different metaphors. These are explored as they arose from notes in the production diaries, and ideas on method changed at different points.

Product Design Metaphors

> The breaking down of the design process into a 'rational', 'systematised', and 'calculable' scientific method has in fact moved the emphasis of design to the 'end product' i.e. physical object, rather than bringing design closer to the 'end-user'. (Gray and Pirie, 1995, p.5).

The process shares some structure with the standard processes of product design. (market research-ideas-materials research-prototyping-user testing-consumer

testing). That is, the market research could be seen as the Case Studies of other interactive exhibitions, prototyping in installation tests etc. The emphasis is indeed on the 'end-user' however, although with some important differences. Whilst the product designer tends to be bound to abide by the findings of user testing, the artist has more freedom to ignore, or selectively use these findings. The aim of an artwork, after all, may be to alienate or challenge, rather than to please, a certain target group, whilst seeking to please others. The parameters for design projects tend to be fairly fixed (e.g. needs to be usable with one hand, within 3 seconds etc. etc..) The parameters for artworks tend to be more undefinably (e.g. an emotional or aesthetic effect) and much less susceptible to the 'scientific method'. *Individual Fancies* is certainly being tested for specific parameters (relating to group use) but these parameters do not encompass the whole aim of the work. Product design is also usually done in set teams of designers, whereas *Individual Fancies* was more of an individual with assorted advisors.

If comparing the artwork to multimedia product design, then that also is not quite the same, for commercial multimedia products are usually produced by teams of several people, who may be programming separate parts of the same product, with media suppliers and directors. Early prototyping is usually done with clients rather than audiences, and later testing very much for consumer 'likes'. Using the software means that things can be reworked in different ways, but usually are not because of the demands of production.

Film and video metaphors

Some task orders are similar, in particular the development of characters, writing of scripts, gathering of props, then the shooting and recording at a later stage of the process, and are only reshot if problems demand. The programming is perhaps equivalent to the editing process, putting the parts together. Programming, however, allows more flexibility than film, which is mostly a linear production process and linear end result. Film makers work in large teams with specific roles.

Other visual art metaphors

Larger-scale productions like sculpture sometimes have a linear production structure of sketches, maquettes, etc. Often need help from technicians or delegate tasks like bronze casting, which is similar to *Individual Fancies*. 'Testing' is usually testing materials against the artists own judgements, rarely testing with an audience.

Public art is sometimes tested after installation for audience response, but as a *fait accompli*. 'Community-based' art practices sometimes are produced as a series of prototypes with the full participation of the audience, who are sometimes also the producers of the work, making a truly collaborative production team, rather than the 'artist plus advisors' team.

Drama metaphors

> Thinking about interfaces is thinking too small. Designing human-computer experience isn't about building a better desktop. It's about creating imaginary worlds that have a special relationship to reality—worlds in which we can extend, amplify, and enrich our own capacities to think, feel, and act. (Laurel, 1991b, p.33).

If discussing 'audience' and their degree of participation with an artwork, then theatrical arts have some useful things to say. Brenda Laurel has explored this in her book *Computers as Theatre* (1991b). She usefully breaks down dramatic components into categories of 'Action, Character, Thought, Language, Melody (pattern), Spectacle (enactment)' (p.50) and points out the differences between narrative and drama, two things perhaps often confused by interactive artists: Drama enables 'enactment' rather than reading, and an intensification of ideas through condensing of events.
In the wide range of approaches to the artwork/audience relationship from alienation to audience participation, she points out that theatre (and computers) are capable of 'Mediated Improvisation' (p.191) which could perhaps describe the approach of *Individual Fancies*, where the programme is the mediator between real peoples' improvisations, again, like a host. My problem is to try for 'mediated improvisation' without the cringe factor engendered by the phrase 'audience participation'. Is it fair or probable to expect unsuspecting gallery goers to participate in either 'mediated improvisation' or 'audience participation'? *Individual Fancies* tries to encourage rather than embarrass, so the computer 'cast' 'goes first', whilst hopefully the audience gain confidence. Participation is always voluntary.

Whether or not the production structures of theatre are like those of *Individual Fancies* or not depends on the kind of theatre. If I as artist am like the Director/Writer, then I did indeed write the scripts, and direct actors, and have help from technical staff. Rehearsing, and performing a play in the provinces (before moving to London) could be seen as 'prototyping/audience testing'.

The multimedia authoring software 'Director' uses a theatrical or filmic metaphor for its structure, so perhaps this metaphor is a useful one, with some important caveats: The very point of theatre is that it involves real live people. Computers can never replace that, and are often annoying when they try. Laurel's work has been criticised for trying to 'characterise' the interface (1991b), when the interface sometimes does not need one (for example Iwai's *Resonance of 4*). People aren't expecting theatre, they are expecting art.

Other Metaphors

Sometimes it feels like creating a Frankenstein body from varied body parts- combining science with creativity? As a photographer I'm perhaps used to the tensions of technology vs. art. and am not too worried about it, despite the dangers of getting sucked into obsessive programming. I actually enjoy discussions with real nerds, who seem enthusiastic to share knowledge.

The metaphor which keeps recurring is that of conversation itself, maybe because of the taxonomy development. I have to have many conversations with many people because the range of skills is so wide and the information not readily available. I have to persuade and bargain and give and take, and my ideas are often changed by other people's opinions, like real conversation. I often seem to end up over real tea and biscuits, reflecting the artwork itself. I have to bear the audience in mind all the time (like dating agency, like a party host?). The conversation demands hybridity, and has to move on with developments. Is the host 'controlling' or laissez-faire? I am not working in a team, but a larger network of advisors.

c) Technical notes

Software used to produce the artwork:

Interactive multimedia authoring: Authorware for Mac v.3
Image manipulation: Photoshop v.3
Sound editing: Soundedit Pro

Hardware used to produce the artwork:

Mac Centris with 20Mb RAM and 1GB hard drive
Wacom graphics tablet
Apple Quicktake digital camera
Nikon 35mm camera and studio flash
Sony Walkman/Sound studio

Installation arrangement:

Figure 72: *Individual Fancies* installation shot showing suspended projector.

{VIDEO CLIP ON CD} 9: *INDIVIDUAL FANCIES*; INSTALLATION DETAILS.

{VIDEO CLIP ON CD} 10: *INDIVIDUAL FANCIES*; CHAIR SWITCHES.

{VIDEO CLIP ON CD} 11: *INDIVIDUAL FANCIES*; TEAPOT MECHANISM.

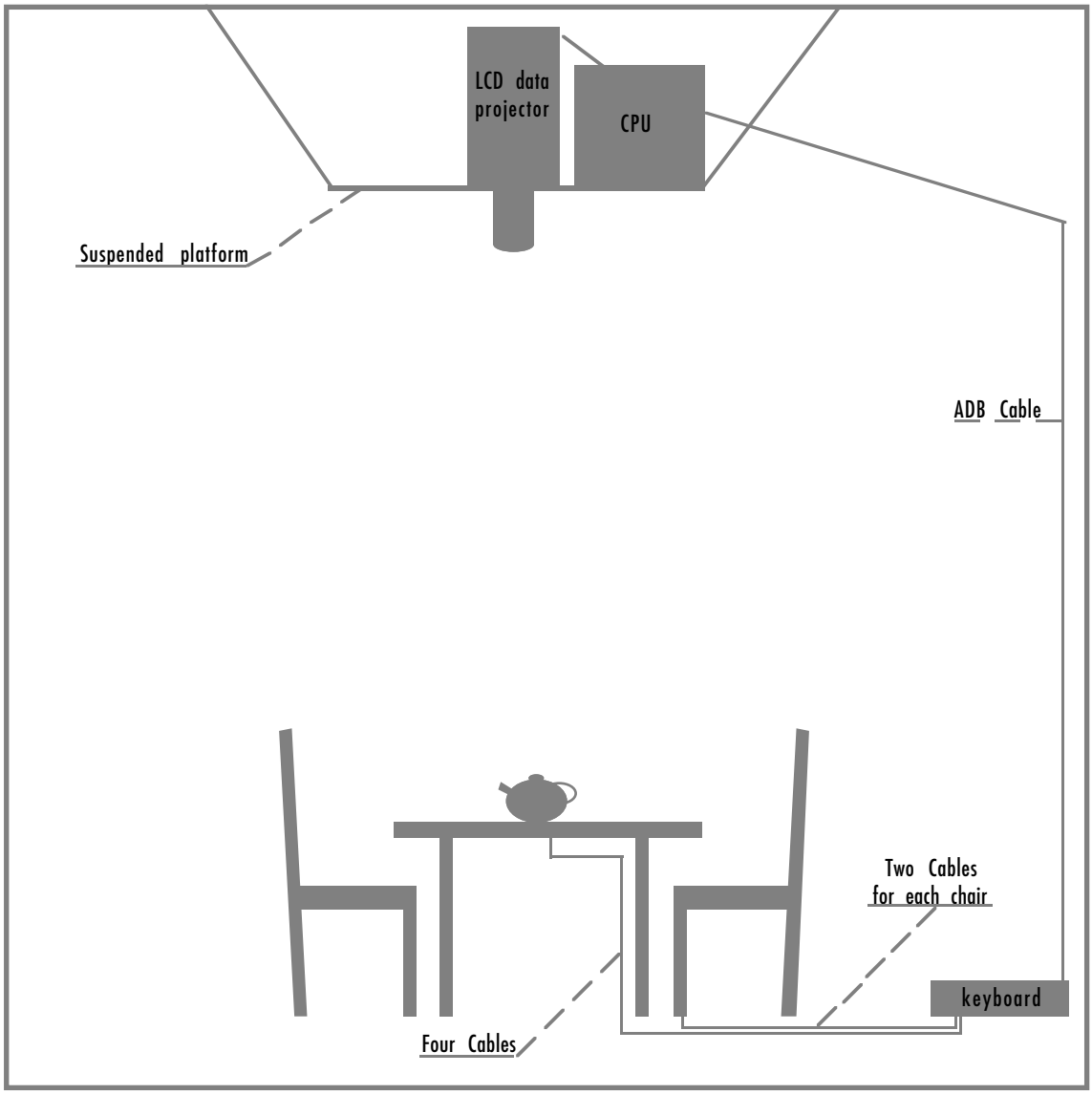


Figure 73: *Individual Fancies*; installation diagram.

As can be seen from the figures, the installation combined mechanical switches with the programmed element on the computer.

The mechanical switches were connected to two-core speaker wire, which were in turn each soldered to the two connections on the back of the keyboard circuit board, to correspond to one key stroke (so, for example, the switch which was triggered when someone sat down in one chair was connected to the letter 'a' key, and when that switch was closed, it was effectively the same as pushing the keyboard key 'a'. Then Authorware could be programmed to do certain things (i.e. hands appear in that place) when 'a' is pressed.

There were 2 switches for each chair; one registers sitting down, one registers getting up. The seat pad is on a spring, and a lever mechanically presses the two switches. The teapot pouring involves four switches. When the teapot is tipped in

the right position, the brass lever underneath hits a switch; one for each teacup. This triggers the tea-pouring image etc.

So, 12 keyboard keys have switches attached, and the keyboard case has a section cut out to accommodate the wires. The 'delay until repeat' keyboard control panel on the Mac needs to be turned off to avoid repeat triggering.

The table and chairs sit on a square of chipboard that the legs can be fastened to to prevent movement. There are routed channels in the chipboard and the wires are led across these channels and up table/chair legs. The rug has holes for the legs, and covers over the wires.

Equipment needed to show work:

A Mac computer: Quadra or Centris type or better, with at least 16 Mb RAM and 40Mb of free hard disc space.
An LCD data projector and Mac cable, to project downwards onto table top. Image size 1.1 metre by 1.1 metre. (This piece is actually better with an LCD than a more expensive CRT type projector.)
Equipment which the artist supplies:
1 wooden table 1.1 m x 1.1 m x 1.1m
4 wooden chairs with built and sensors
1 rug 2m x 3m
cups and teapot incl. spares.
small domestic amplifier.
Mac keyboard with attached sensors.
Room requirements:
Controllable lighting; must be dark or very dim.
Controllable sound; soundtracks etc. from other works should not be audible.
Minimum space 4.5m x 4.5m
Means of suspending projector above table (at approx. 9 ft or more above ground).

Credits:

Voices of the characters at the table:
Scottish divorced father: Keith McIntyre
Asian homeworker: Anjali Menrai
Computer freelancer: Peter Mogridge
Woman victim of crime: Beryl Graham

Appendix VI: Research visits, published writing etc.

All exhibits, visits, published writing, lectures given, and media appearances relevant to the subject of the research (during the research period) are listed. Those which exclusively concern the M.Phil./Ph.D. research are marked *.

Exhibitions of *Individual Fancies*

*Apr 17th 97	Reg Vardy Gallery, Sunderland.
*Jul 31st - Aug 9th 97	Zone Gallery, Newcastle.

General Research Visits, Conferences Attended etc.

Nov 96	*Digital Dreams 4* conference, Newcastle.
Nov 95	*Digital Dreams 3* conference, Newcastle.
Sep 95	*ISEA '95* conference/festival, Montreal.
May 95	*Video Positive* festival, Liverpool.
Nov 94	*Digital Dreams 2* conference, Newcastle.
Oct 94	*Terminal Futures* conference, ICA, London.
Sept 94	Tramway, Glasgow case study.
Sept 94	*RADical* research conference, Aberdeen.
Aug 94	Watershed, Bristol case study.
May 94	*MediaActive* conference, Liverpool.
Feb 94	Westminster University multimedia course visit
Feb 94	Royal College of Art multimedia course visit

Published Writings

1996	***Serious Games*** (exhibition catalogue Laing/Barbican) Catalogue essay
Feb/Mar '96	**Creative Camera** *"The International Symposium of Electronic Art, Montreal '95"* Festival review
*1996	**Fractal Dreams** (book, pub. Lawrence and Wishart) *"Playing with Yourself: Pleasure, Interactive Art and Audience"* 7,000-word chapter.
1995	**The Photographic Image in Digital Culture** (book, pub. Routledge) *"The Panic Button: Back to the Future of Pornography"* 7,000-word chapter.

*Apr 1995 **Proceedings of the 1st Conference on Computers in Art and Design Conference '95.**
"*Interactive Computer-Based Art and its Relationship to Audience*"
short paper on early stages of Ph.D. research

Sep 1994 **Signals festival catalogue** (UK)
"Digital Déjà Vu"
Old battles around gender and new technology.

Lectures, Papers and Presentations

*Feb 1997 **Slade School of Art, London (UK)**
"Serious Games and Ph.D. Research"

*Feb 1997 **Middlesex University, London (UK)**
"Ph.D. Research on Interactive Art and Audience"

Feb 1997 **Watershed Media Centre, Bristol (UK)**
"Serious Games and Narrative"

Nov 1996 **Engage Conference, Newcastle (UK)**
"Interactive Art: Interaction in Process or Product?"

Nov 1996 **Laing Art Gallery, Newcastle (UK)**
"Serious Games: An Introduction"

Feb 1996 **Teesside University (UK)**
"Interactive Art: Real Fictions"

Apr 1995 **VideoPositive Seminars, Tate Gallery, Liverpool (UK)**
"*Games of Art, War … and Intimacy*"

*Apr 1995 **Computers in Art and Design Conference '95, Brighton (UK)**
"*Postgraduate Session: Interactive Art M.Phil./Ph.D. Research*"

Feb 1995 **Museum of the Moving Image (BFI), London (UK)**
"*Interactive Digital Art from the USA*"

Oct 1994 **Leeds International Film Fest. Censorship Conference, Leeds (UK)**
"*Pornography, Censorship and the New Media*"

Oct 1994 **Seeing the Light conference, Birmingham (UK)**
"*Fear of Computers: Grasping the Technology*"

Aug 1994 **ISEA Internat. Symposium on Electronic Art, Helsinki (Finland)**
Paper accepted: *"Choices: Gender Issues for Electronic Art"*

Feb 1994 **Museum of the Moving Image (BFI), London (UK)**
"*Interactive Art and Gender*"

Media appearances

21.11.96. ***Look North*, Channel 3.** *Serious Games* exhibition interview.

13.9.94 ***Women's Hour*, BBC Radio 4.** Digital photography.

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