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PRODUCT DEVELOPMENT IN THE
LEISURE SOFTWARE INDUSTRY:
A DESIGN METHODOLOGY FOR THE
DEVELOPMENT OF INCLUSIVE
INTERACTIVE DIGITAL MEDIA



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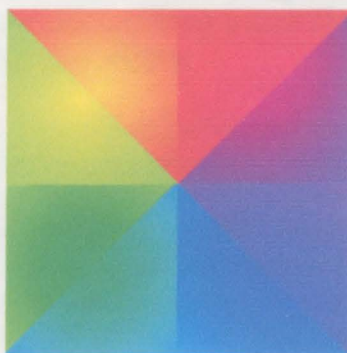
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Product Development in the Leisure Software Industry:

**A design methodology for the development of
Inclusive Interactive Digital Media**



A PhD Thesis submitted by

Susan April Wilson

to

Kent Institute of Art & Design / University of Kent at Canterbury
in partial fulfillment for the
Degree of Doctor of Philosophy in Industrial Design

KIAD / UKC

April 2005

Abstract

The goal of this research project was to develop a methodology for designers that assists and quantifies concept design decisions so designers can; enable increased user access; widen the user demographic of interactive digital media; and improve participation and competence with technology through play.

The background, focus and methodology of the study are established in the context of Human Computer Interaction achieved during play. Various potentials and limitations for social and technological development are discussed, along with the importance of *Designing for Inclusivity* as an approach to the design process.

Literature was reviewed from areas relevant for understanding the research issues and undertaking the design investigation. These included theoretical and empirical work on the psychology of user motivation, play, learning and social development. Design processes relevant to interactive digital media design and development were also reviewed and considered. The study revealed a lack of concept generation techniques to guide designers of interactive play media.

The *Play Concept Generation Technique* therefore informs developmental design and practice by defining how interactive play concepts, interfaces and content can be created, based on *psychological motivator profiles* of users. Concepts and content produced by this process have proved to be more appealing to a broader user demographic than those currently considered 'gamers'. The multidisciplinary approach encourages the potential of wider user participation in interactive play environments, enabling and promoting psychological, technological and social development and competence.

Additional outcomes are; the 'Play Chooser/Nexus' designed to assist development of interactive digital play media, and several concept proposals for *Inclusive Interactive Play*, aimed at widening and increasing user access and competence with technology.

Designing for the Future, provides reflection on the journey taken by this study. Key contributory factors are discussed in relation to the design approach proposed for Inclusive Interactive Digital Media. The importance of *Designing for Inclusivity* is reiterated since this proactively enables access to interactive play media where familiarity, learning and competence with technology and socially interactive systems are undoubtedly acquired. Future considerations identifying the potential of Inclusive Interactive Digital Media to improve future social and technological development are also discussed.

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Firstly, I would like to thank my supervisors; Clive Arundell, Dr David Hawkins and Dr Tevfik Balcioglu who have provided support, advice and guidance throughout this study. I would also like to express my appreciation to Professor Peter Robertson who was my initial lead supervisor, Professor John Sharp at the University of Kent, Dr Jim Terkeurst at the University of Abertay and Professor David Buss, Kent Institute of Art & Design, for their valuable insights and informed opinions.

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A special mention for Phil Gomm MA, all my family and friends who have supported me throughout this study, and especially my daughter, Ella Wilson, who has shared me with this project almost all her life. Finally a tribute to *all* of the user participants, without whom this work and particularly the empirical research, could not have been undertaken.

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1 Introduction

This introductory chapter provides an overview to the research work presented in subsequent chapters, along with information on the context, focus and methodology of the research described in the thesis.

1.1 Background

The research and development in this dissertation has its roots in some questions that emerged while undertaking a study to resolve concerns that had arisen in a market segmentation study¹ of PC users undertaken by request of Electronic Arts, a major global software publishing company. This study had indicated that there were fewer sales of leisure software games amongst teenage girls when compared with boys of a similar age and with girls in the 5-12 age bracket just below.

The publisher recognised that the leisure software industry was dominated by games and products that had a strong male orientation. The publisher's philosophy for leisure software was that "games are for everyone" and they were determined to find ways to broaden their user population and make 'gaming' accessible to all, including teenage girls. They wanted to know whether it was true that these girls were not buying software games and if not, why not? Were they interested in leisure software or not? If they were interested, what would they want to buy? The publisher did not feel that the teenage female market segment had to date been comprehensively investigated. This was a potential new group of users and the publisher was keen to develop new products for a wider demographic.

The publisher was specifically looking for a research and development programme that was not prejudiced by any substantial knowledge of the games industry and that could not only research the field, but also provide product concept designs and solutions that would begin to address wider user participation in an applied environment.

The initial year of this study therefore investigated, through primary fieldwork, a representative section of the UK female market, aged between 13-19 years old, during the period November 1999 to September 2000. The main aim of the investigation was to study the attitude and behaviour of these girls towards leisure software.

An initial literature review, late in 1999, revealed a large volume of literature and theory on the psychology of play, motivation, learning and social development. The specific discussion of this literature appears in chapter 2 and covers theories ranging from the 17th century to the present day. This reference material provided a background for the study and became influential in aiding the design process. It was decided to pursue a chronological analysis of psychological literature in this chapter since it was felt this would show the evolutionary nature of much theoretical work in this area.

The psychological literature on play, motivation, learning and social development, along with that detailing new and traditional design methods, contributed to the path taken for the design process in this study. This process also referenced information from literature specific to interactive digital media, which included specialist areas such as: new technology, hardware development, software games, graphic styles, culture, leisure, lifestyle, history, gender, ergonomics and human computer interaction. Although the study began with a focus on software games, this focus widened as the study progressed and it became clear that the influence and appeal of interactive play offered greater potential than just as a leisure activity.

The review of social literature enabled a broader understanding of the context of the study and helped to establish its place in the domain of cultural and social development. Some of the opinions on social and technological development, including philosophical issues raised by new technology, are discussed later in this introductory chapter, in the section covering the research context.

A review of design process literature at the start of the research in autumn 1999, revealed no published methods specifically for interactive software games. Methods had developed within Systems and Information Design, but none of these were specifically useful tools for deriving or establishing information within a play context, particularly in relation to concept generation. From discussions with professionals within the industry at that time, no consensus on methodologies for the research or design process under investigation was identified.

A large number of design methods were therefore researched, reviewed, analysed and evaluated in order to establish whether any of them could be used to aid the design of a new method for the phenomena under investigation. The literature review of design methods is covered in detail in *Chapter 3: The Design Process*, and is organised into three main groups; existing design processes, technology based design methods and software game design processes. Primary research with an existing publishing company and several development studios was also undertaken to establish their structure and to identify any design processes being used in development.

The fieldwork to access potential users or consumers of interactive digital play media, was undertaken during the period autumn 1999 to summer 2000. During this time, the evaluation of user interests, user behaviour and interactive psychology was studied with the use of a prototype tool kit that was researched, designed and developed. This led to the development of a proposed design methodology, which is described in detail in *Chapter 4: Fieldwork: Accessing potential users*. The process and tool kit were developed specifically for use in

the study of an identified potential user group comprising teenage girls between the ages of 13-19 years. The process was later tested with three teams of student designers to establish whether it assisted designers in the generation of concept ideas relating to a wider audience of 25-50 year old users.

Building on the literature review and the fieldwork, *Chapter 5: Designing for the Future: Inclusive Social and Technological Development*, provides reflection on the journey that this research study has taken. The changes in thinking that occurred as the work progressed are discussed along with an evaluation of the utility value of the approach taken and whether this has the potential to enhance learning, participation and competence within the context of technological and social interaction. The importance of *designing for inclusivity* is discussed and attributes of the research that inform inclusion and cross-cultural design are clarified. The work concludes with recommendations for a more pro-active approach to the inclusive design of interactive digital media.

During the whole of the study, it was necessary for the literature review in each area to be ongoing. This continuous review reflected the constant growth of literature on new technology, and also allowed the author to include and analyse new and relevant research in the area wherever possible. Additionally, the software design methods and development processes within games production were evolving during the time of the study, and it was necessary to reflect this in the thesis methodology and conclusions. The lack of published or even identified processes until late in the initial review process (2001) proved to be a difficult and challenging problem to overcome. It was also necessary to remain aware of the dynamic advance of new technology itself, along with a constantly changing impact on society, culture and lifestyles providing a context for the study whose influences over time were variable, highlighting the importance of recognising time as a factor in itself.

1.2 The research context

The overall context of the study is that of humans accessing computers and thereby technology in general. The particular focus is on the potential of this access being achieved through play.

As Diane Ackerman identifies in her book *Deep Play*,

“Play is widespread among animals because it invites problem-solving, allowing a creature to test its limits and develop strategies. In a dangerous world, where dramas change daily, survival belongs to the agile not the idle. We may think of play as optional, a casual activity. But play is fundamental to evolution. Without play, humans and many other animals would perish.” (Ackerman, 1999:4)

Figure 1.1 (overleaf) illustrates the factors that make up the fundamental context of this study. The left hand side of the diagram illustrates the human psychological input to the domain under consideration, and the right hand side illustrates the inputs of computers and technology. The ‘access’ to computers by humans is achieved through the design of interactive digital media, whose path is mapped by the central arrow flowing downwards as the design process develops.

Software games were the first examples of interactive digital media, designed by scientists or technologists for their own use and pleasure. Play was a means for experimentation. Some of the original computer games, for example, *Pong*, were almost certainly born out of the first reported experimental interface sending two blips across a screen in 1966. (Herz, 1997)

It is clear that these first ‘games’ were devised by people who already had a developed knowledge of the available technology. (Herz, 1997) These games attracted interest and were soon taken up by a relatively small niche user group who also had either a professional or passionate interest in technology. Thus a

cycle breeding new technologists began to form throughout the latter part of the twentieth century and into the beginning of the twenty-first, with the interest in software games and interactive digital media growing continuously.

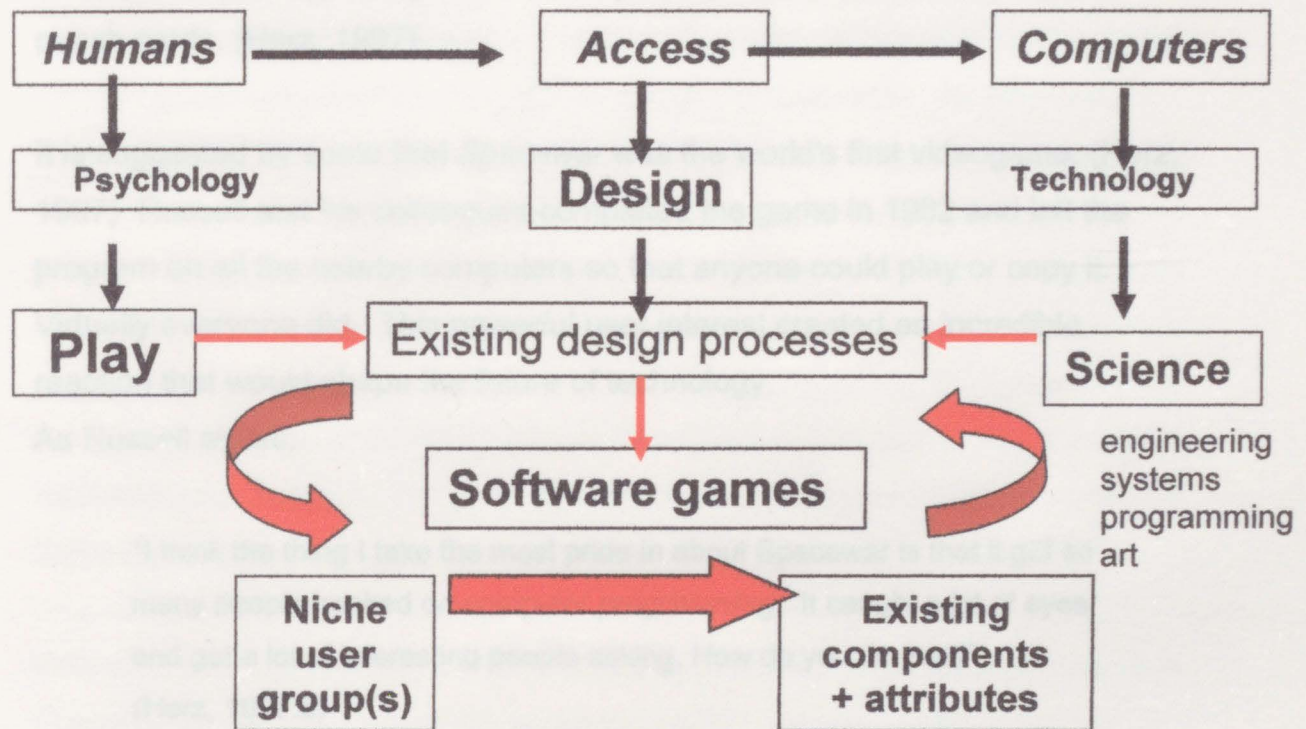


Figure 1.1 Diagram to illustrate the cycle breeding new technologists.

As a result of this iterative development of the field through rapid technology change and user interest in expression, the initial design processes for software games and interactive digital media were not formally documented, but appear to have grown out of experience and personal preference. Certain game genres arose out of the interests of those initial technologists and the components and attributes of these early games became firmly established as the 'norm'; defining the paths of development, but also limiting potential exploration beyond set boundaries of particular genres.

Space war games, for example, became particularly popular after 1961 when Stephen Russell, Martin Graetz and Wayne Wiitanen conceived a computer game called *Spacewar*. This game featured 'two spaceships firing photon torpedoes against a field of electronic stars' and ran on the PDP-1, a computer

the size of three refrigerators, manufactured by the Digital Equipment Corporation and located at the Massachusetts Institute of Technology (MIT). *Spacewar* was only possible as the PDP-1 was a remarkable technological innovation in its day, being the first computer to have a screen and not use punch cards. (Herz, 1997)

It is suggested by some that *Spacewar* was the world's first videogame. (Herz, 1997) Russell and his colleagues completed the game in 1962 and left the program on all the nearby computers so that anyone could play or copy it. Virtually everyone did. This powerful user interest created an incredible reaction that would shape the future of technology.

As Russell states;

"I think the thing I take the most pride in about *Spacewar* is that it got so many people hooked on computer programming. It caught a lot of eyes and got a lot of interesting people asking, How do you do that?"
(Herz, 1997:8)

Spacewar influenced many of these people to go on and become software developers themselves. There may have been many factors for this take up of software development, but research on human behaviour suggests that it was the human drive to play, even on a massive PDP-1 computer that they could not resist. So, as early computers developed, so did the code that turned them into game machines. By the early 1970's almost all academic mainframes were housing simple software games. When these programs were written, computers were incredibly large and expensive and no one imagined that computers would one day become cheap enough to make them a mass phenomenon.

The first generation of software games was therefore mainly concentrated, as stated previously, around those technologists who had knowledge of, and access to, the technology required. Thus, although the first experimental

interfaces were devised in the late 1950s and throughout the 1960s, it took until 1972 before *Pong* became the first arcade game, and 1974 before it was released for home use by Atari. (Herz, 1997)

Ideas for new games were developed throughout the 1970's and 1980's, simply driven by what was already considered popular or desirable. As they were created primarily by technologists, the genres that arose were limited and there was little attempt to broaden the user population by challenging the design process. Consequently, the niche user group continued to fuel the components and attributes of software games and were usually the people who then went on to work within the technological fields themselves, designing and programming the next generation of software games. The result of this was an iterative cycle, as developers became very good at incredible technological achievements, but arguably within very limited arenas of play.

Critical debate during this period identified the need for wider user participation. Subrahmanyam and Greenfield, when they began their research in the 1980's on the effects of video games on cognitive processes, were struck by the fact that video games were a largely male pastime.

"Not only did young boys play video games more often than girls both at home and in arcades (Dominick 1984; Lin and Lepper 1987; Rushbrook 1986), but this difference persisted into the college years (Morlock et al. 1985). Moreover, one of the most comprehensive survey studies of the 1980s found that even kindergartners of both genders viewed video games as more appropriate to boys (Wilder, Mackie, and Cooper 1985). At the same time, games were generally the first and most frequent childhood computer experience. Therefore we, like others, were concerned that females might be at a disadvantage where computer usage was concerned because of the speculation that computer and video games provide an easy lead-in to computer literacy (Loftus and Loftus 1983; Greenfield 1984; Greenfield and Cocking 1996; Kiesler et al. 1985)." (Subrahmanyam and Greenfield, 1998:46)

Regardless of this apparent gender bias in the games industry, in the technological climate of the early twenty-first century there is little doubt of the success, in financial terms, if nothing else, of the software industry. Figures published by the European Leisure Software Publishers Association (ELSPA) show that in the year 2000, UK sales alone of leisure software products reached almost 40 million units, a 16% increase on the previous year. Since then, the figures have continued to rise. In 2001, total leisure software sales reached a total of 47.2 million units (£1055 million).

On a global scale, the UK is considered to be the third largest individual country market after the United States and Japan, but was the clear leader in Europe in 2002, with total UK leisure software sales reaching £1,081 million². According to the same report, in the UK, 215 million units of leisure software have been sold since 1995, and across the world, since 1995, nearly 3 billion units have been sold. Current figures for 2004, rate the value of the UK leisure software market at £1,217 million, quoting an increase of 6% since 2003.³

Electronic Arts, one of the largest global publishers, has been particularly successful in developing and publishing for existing game genres, but at the time this study began was aiming to develop a strategy of 'games for all'. One of their top marketing executives explained how they wanted to promote the idea that *anyone* could play software games. As previously stated, this research study was initiated by the desire to find out what kind of games would interest teenage girls in particular, in addition to other groups with little current interest. The publisher mentioned above, had previously commissioned a market research report, which had concluded in 1999 that there was a sharp fall in the number of teenage girls, aged 13-19, buying PC software when compared with girls in the age group below.

This discovery led to the specific user group research which is detailed in chapter 4, *Fieldwork: Accessing Potential Users*. This project initially was intended to identify whether the market research conclusions meant that this particular female group had no interest in software games at all. The results of initial fieldwork established that teenage girls did, actually, have an interest in interactive play, but simply did not buy the existing games as much. The project aim then focused on finding out what kind of game these young women would be interested in buying.

The focus of the study was born out of that initial research, as the preliminary literature review identified that no concept generation technique existed specifically for the design of software games. It also became frustratingly clear that there was a definite lack of variety of content in software games to appeal to new, or even mainstream users, and that most publishers were opting for safe options for leisure software development either by regenerating old concepts that had already made a profit, or by acquiring franchise rights to existing well established fictional concepts.

In order to generate new concepts for interactive play, and thereby attract wider user participation, it was essential that a design process be developed in order to establish how to attract potential users that did not currently have an interest in existing products. To explain the context of this, various extra inputs were considered and added to the initial domain of study. Figure 1.2 illustrates these additions (in blue) that expand the original diagram:

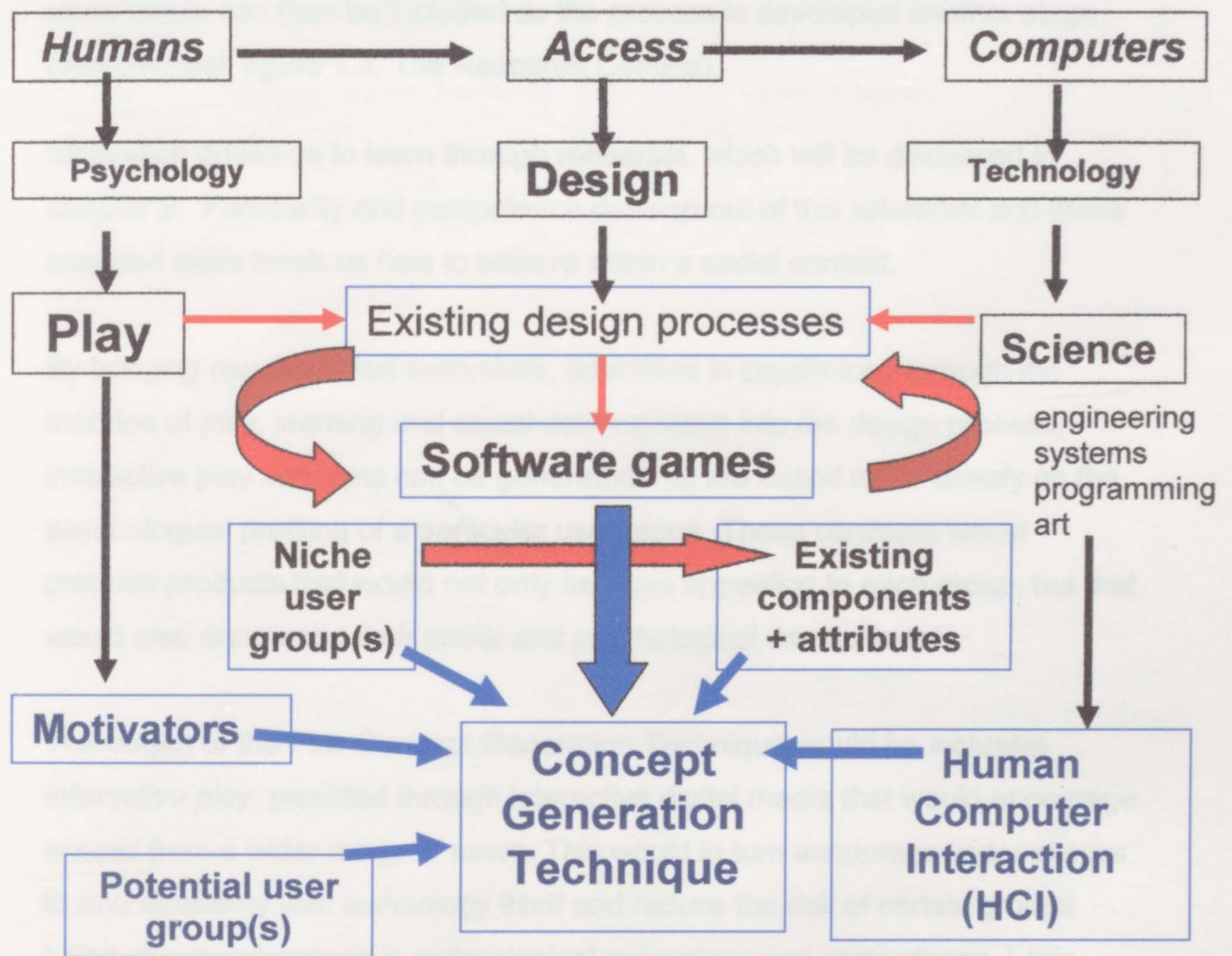


Figure 1.2 Additional inputs expanding the context of the study.

For a designer, it is essential that the design of any concept generation technique should consider elements from all possible areas. To the left of the diagram, 'Motivators' are added, which are the central psychological drivers of play (see chapter 2). To the right, the discipline of Human Computer Interaction (HCI) is added. HCI has emerged out of the advances of technology as a research field in its own right and this will be discussed later in this introductory chapter. In the centre of the diagram it is apparent that data needs to be considered from both the potential and niche user groups, in addition to the existing components and attributes of software games in order to provide

comprehensive input to the design of a concept generation technique. Even more inputs can then be included as the process is developed another stage (see overleaf, figure 1.3, The Research Context).

Motivation drives us to learn through rehearsal, which will be discussed in chapter 2. Familiarity and competence develop out of this rehearsal and these acquired skills teach us how to behave within a social context.

By bringing psychological motivators, (identified in psychology through the theories of play, learning and social development) into the design process, interactive play concepts can be generated that are based more closely on the psychological profiling of a particular user group. These concepts would produce products that would not only be more appealing to each group, but that would also encourage their social and psychological development.

The output of the Play Concept Generation Technique would be *inclusive interactive play*, provided through interactive digital media that would encourage access from a wider range of users. This would in turn encourage wider access to and familiarity with technology itself and reduce the risk of certain groups being at a disadvantage in technological awareness and competence. Long term this process could arguably produce social and technological advantage.

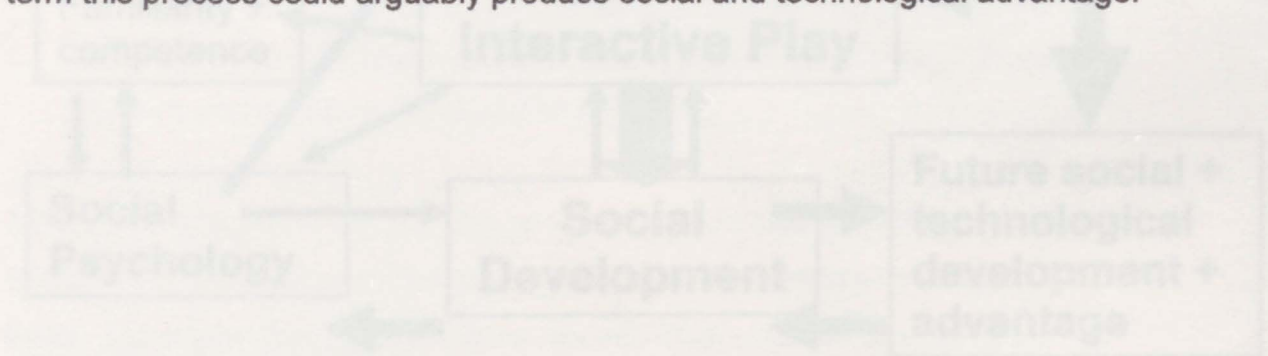


Figure 1.3 The Research Context

KEY: —●— Existing development cycle
 — Influences on Play Concept Generation Technique
 - - - - - Potential outputs

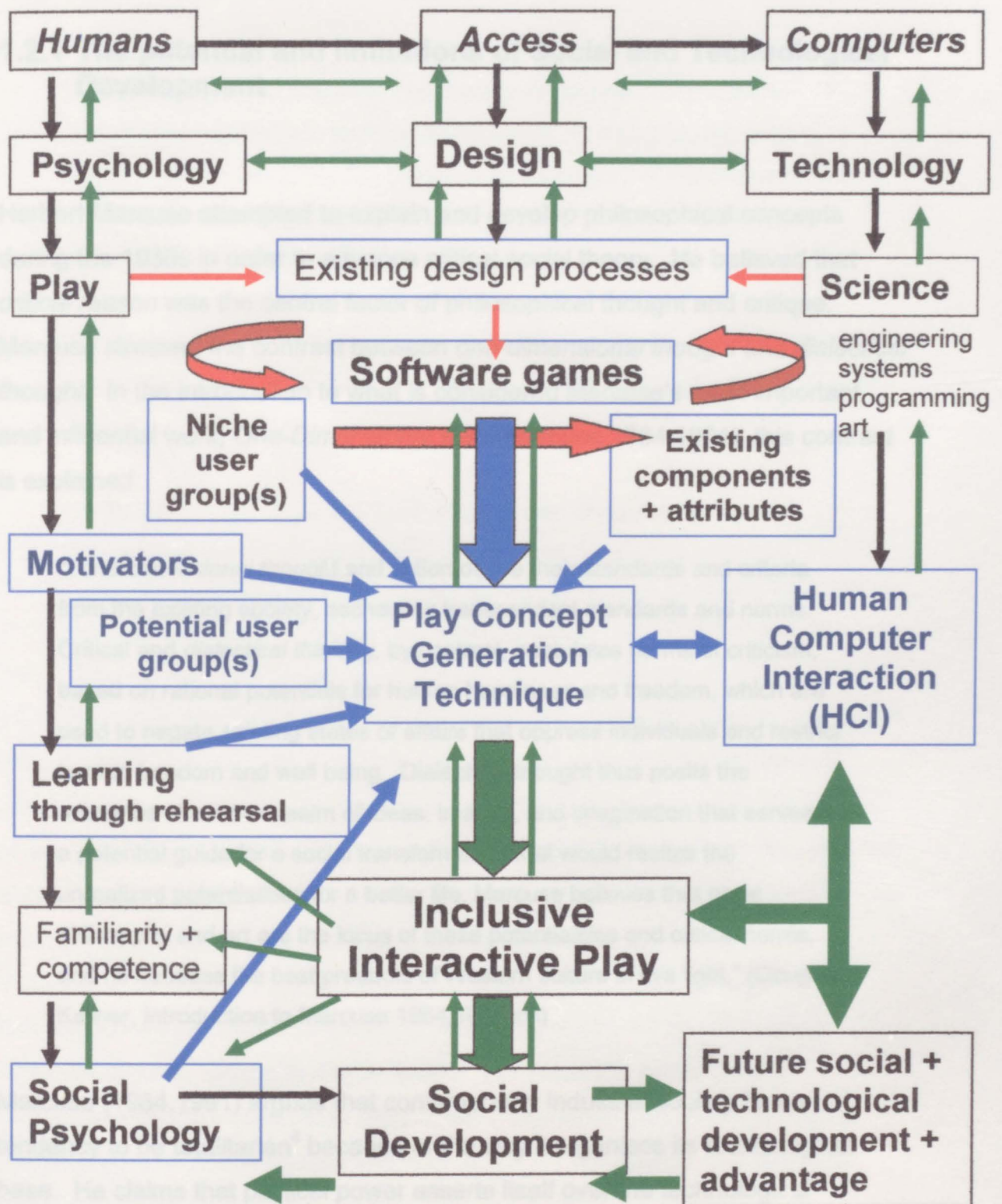


Figure 1.3 The Research Context

KEY: → Existing development cycle
→ Influences on Play Concept Generation Technique
→ Potential outputs

1.2.1 The potential and limitations of Social and Technological Development

Herbert Marcuse attempted to explain and develop philosophical concepts during the 1930s in order to advance critical social theory. He believed that *critical reason* was the central factor of philosophical thought and critique. Marcuse stressed the contrast between *one-dimensional thought* and *dialectical thought*. In the introduction to what is considered Marcuse's most important and influential work, *One-Dimensional Man* (Marcuse, 1964, 1991), this contrast is explained:

"..one-dimensional thought and action derive their standards and criteria from the existing society, eschewing transcendent standards and norms. Critical and *dialectical thinking*, by contrast, postulates norms of criticism, based on rational potentials for human happiness and freedom, which are used to negate existing states of affairs that oppress individuals and restrict human freedom and well being. Dialectical thought thus posits the existence of another realm of ideas, images, and imagination that serves as a potential guide for a social transformation that would realize the unrealized potentialities for a better life. Marcuse believes that great philosophy and art are the locus of these potentialities and critical norms, and he decodes the best products of Western culture in this light." (Douglas Kellner, introduction to Marcuse 1964, 1991:xvi)

Marcuse (1964, 1991) argues that contemporary industrial society has a tendency to be totalitarian⁴ because of the way it organises its technological base. He claims that political power asserts itself over the technological organisation and that governments of advanced and advancing industrial societies can only maintain security when they succeed in mobilising, organising and exploiting technical, scientific and mechanical productivity. He claims that this productivity mobilises society as a whole, and goes beyond any particular group or individual interests. Marcuse stresses that

"The prevailing forms of social control are technological.....but in the contemporary period, the technological controls appear to be the very embodiment of Reason for the benefit of all social groups and interests – to such an extent that all contradiction seems irrational and all counteraction impossible." (Marcuse, 1964, 1991:11)

Marcuse argues that in the most 'advanced' civilized nations, social controls have penetrated to a point where even individual protest is affected at its very core. Marcuse claims that,

"Today this private space has been invaded and whittled down by technological reality. Mass production and mass distribution claim the *entire* individual, and industrial psychology has long since ceased to be confined to the factory." (Marcuse, 1964, 1991:12)

Marcuse concludes that in reducing the space of imagination, society forces the imagination to prove itself on new terms, where images are translated into potential capabilities. He claims that development is dependent on the nature of the society that develops it. Marcuse argues, that technical development has separated imagination from the realm of material production and material needs, and invested it with technological logic, therefore reducing the 'free faculty of the mind'. He also claims that this reduces the gap between imagination and Reason, so that they both become dependent on finding common ground. Marcuse argues further that given the capabilities of advanced industrial civilization, 'play of the imagination' has become mainly about playing with technical possibilities to test for the chance of realisation. (Marcuse, 1964, 1991:253).

McLuhan and Powers (1989) echo the opinion of Marcuse on the loss of individual identity:

"The bad news is that all persons, whether or not they understand the processes of computerized high-speed data transmission, will lose their old private identities. What knowledge there is will be available to all. So, in that sense, everybody will be nobody. Everyone will be involved in robotic role-playing including those few elitists who interpret or manage large-scale data patterns and thus control the functions of a speed-of-light society. The more quickly the rate of information exchange speeds up, the more likely we will all merge into a new robotic corporate entity, devoid of true specialism which has been the hallmark of our old private identities. The more information one has to evaluate, the less one knows. Specialism cannot exist at the speed of light." (McLuhan & Powers, 1989:129)

This quote illustrates the view of McLuhan and Powers that tailored data tends to give a user an illusory sense of identity. They predicted, in 1989, that the initial competition between different sorts of hardware will end in a merger of durable and efficient hardware that will cease to be noticed and that software will emerge as the key factor in technological development. They describe software as being,

"a system designed to service the customer's total communication needs in almost an organic fashion." (McLuhan & Powers, 1989:127)

However, McLuhan and Powers are keen to stress that as software becomes more easy to use, decentralization intensifies. They propose that a remedy for this is to diversify software, which they argue tends towards decentralisation and discontinuity, using right-hemisphere mentality from the realms of musicians and artists. In contrast they claim that hardware tends towards centralism and connectivity, and is identified with left hemisphere mentality⁵, the cortical region dealing with hierarchies and of linear, mathematical and sequential categories. The ordering sense of the left brain is therefore quantitative (diachronic) in contrast with the right brain, which is considered qualitative (synchronic). The back, or posterior, lobes of the upper brain, deal with specific touch sensations and spatial information. These interact with the

frontal lobes, which tend to abstractly play with the constraints of time and the ability to plan in order to link the world of now to the world of future. These identified parts of the brain in conjunction with the lower brain; which has evolved over millions of years, and deals with basic functions such as heartbeat, respiration, aggression, ritual, territoriality, social hierarchy and emotions; indicate that a human brain has separately interfacing cognitive systems. (McLuhan & Powers, 1989)

The dominance of left or right hemisphere thinking when problem-solving is largely dependent on environmental factors. According to Trotter (1976), in his observations with Third World or non-literate societies, Third World countries tend to adopt oral-aural, acoustic or qualitative representations where they have not developed the use of a phonetic alphabet. In contrast, First World countries tend to support visual or quantitative representation (left-hemisphere thinking) exemplified in complex transport networks and 'logical or rational' administration. The dominance of the left hemisphere, leading the right brain in the context of much 'Western' culture, suppresses the right hemisphere. The right hemisphere on the other hand, takes all factors into account.

McLuhan and Powers argue that;

"The present electronic age, in its inescapable confrontation with simultaneity, presents the first serious threat to the 2500 year dominance of the left hemisphere." (McLuhan & Powers, 1989:62)

According to McLuhan and Powers, oriental nations allow the right hemisphere to direct the left and they claim that this right hemisphere culture has a lot in common with the simultaneity of the age of electronic information. They propose that the latest technological developments are structurally right-hemisphere and 'oriental' in nature and effect, and that

"The right-hemisphere culture naturally seeks to tune or reconfigure intervals rather than to connect situations and relationships."

(McLuhan & Powers, 1989:65)

Intervals are explained as the space between things, which define both spaces and are "where the action is". This space is both audile and tactile. McLuhan and Powers, report that the oriental approach is to use this interval between things as a primary means of getting in touch with a situation. They stress the importance of constant readjustment to our surroundings, taking all factors into account and attempting to find a balance between left and right hemisphere thinking and problem solving.

In the context of social and technological development, one notion that is a potential response to the above view, is found in *Cyborgs*. Haraway (1991) claims that cyborgs have emerged as significant reinventors of humanity. This radical representation has come about in order that individuals can claim a place in technological space:

"By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are cyborgs. The cyborg is our ontology; it gives us our politics."

(Haraway, 1991)

It is not clear whether this resituation and reconfiguration of individuals in technological space and terms, represents a continuation, a sacrifice, a transcendence or a surrender of 'the subject'. However, later opinion on this from Jordan (1999), suggests that the cyborg individual is someone buying self-identity from rampant capitalism. Whatever the definition, it cannot be denied that there has been an increase in 'cyborg' like characters appearing in virtual environments. *CyberAnthropology*, draws upon Haraway's cyborg anthropology and recognises that virtual communities cannot be defined by geographic or even semiotic ethnic, religious and linguistic boundaries. Instead these communities appear to provide a *liberatory* aspect to our lives which can

no longer be achieved easily in our physical communities. Virtual communities allow us to communicate with others in a social space that does not have to conform to the usual limits of time, geographical distance and normative moral conduct.

Mantovani (1996) reports that the lack of clarity regarding social and cultural implications of technological development, reveals the absence of appropriate cultural responses to problems posed by the current forms of technology, rather than simply the presumed immaturity of new technology and its experimental nature.

"It is on the construction of an appropriate cultural framework that possible improvements in cooperative work in technologically advanced environments in the near future depend; not merely on a process of spontaneous, gradual maturation inside technologies which, left to themselves, would eventually find their own appropriate ways of functioning." (Mantovani, 1996:79)

Mantovani argues that the two viewpoints lead to very different consequences. The first case proposes *computer socialization* (Ellis, 1991; Kling, 1995), where the overall social context is assumed to be capable of making innovative changes as a result of new technologies. This option is not only interesting to social science researchers, but is also considered, by Mantovani, to be a challenge that postmodern cultures must address so that control can be maintained over living and working environments. The second case leaves the entire question in the hands of professional technicians, who, Mantovani argues, are not currently properly equipped to effectively address the social and cultural issues emerging in new communication and cooperative environments. (Mantovani, 1996)

Mantovani claims that modern technology has the potential to undertake functions of social control. He identifies one form of control function which

competes for power and authority as 'the politics of formalism'. (Bowers, 1992)
Mantovani clarifies the definition of *formalism* as;

"a representational system of a certain sort. A formalism generates representations through the operation of rules over some vocabulary. The elements which make up the vocabulary and the terms which constitute the rules may represent human or machine action, computational procedures or operations, etc." (Bowers, 1992:234)

Mantovani reports that in the introduction of new technologies, we should expect a struggle for power. He warns that delegation of control to technology favours particular groups of people, particularly those that are in a position to gain greatest benefit from increasing the strategic use of information. Mantovani argues that information can be both represented and misrepresented, and that competent groups can make strategic use of both access to and control of this information.

"When new technologies are introduced in an organisation, the presence of different levels of technological competence among its members tends to modify the pre-existing distribution of power so that technically competent members acquire greater power. We believe that the new communication technologies do not generally favour democracy in organizations, except in the sense that they create occasions for redistribution of influence and authority in favour of new groups. They might even erect new barriers of competence and alliances between actors and socio-professional groups." (Mantovani, 1996:96)

Mantovani argues that in an evolutionary context, there is no doubt that human societies generate new technology. Adaptive Structuration Theory (AST; Contractor & Eisenberg, 1990; Contractor and Seibold, 1993; Poole and DeSanctis, 1990,1992) claims that the effects of new communication technologies emerge from a specific set of complex social interactions existing between users. AST rejects the assumption that technology has a general,

essential and even effect on people's lives, instead focusing on users' everyday practices to observe what uses are actually made of technological innovations. AST studies how different groups may use the same technology resources to complete the same tasks in a variety of different ways. Social context is considered highly relevant in the adaptation that takes place between technological innovation and organisational function. (Mantovani, 1996) Mantovani claims that normative social influences mix with informational influences in interpreting meanings assigned to new technology. He considers *Virtual Reality* to be an environment of experience and communication where the question of identity dominates.

"The cyber perspective, as we have seen, seeks from the new communication technologies access to new forms of sociality, freed from the body yet still sensorily vivid. It also seeks different ways of presenting identity and developing relationships, ways which combine efficient simulation of the presence of other people with deliberate uncertainty concerning the real identities of interlocutors." (Mantovani, 1996:130)

Mantovani questions whether the *fiction* of new media is similar in nature and effect to the forms of fiction already in existence. He calls for further investigation in this area and some answers may be provided in the work of Murray (2000) discussed later in this section. However, Mantovani identifies that we are at least now asking *what* we should do with technology, rather than *where* technology can lead us. (Mantovani, 1996:131) There is an important distinction here which implies the necessity for us to decide which goals we choose to guide social and technological development towards.

Mulgan (1997) begins to suggest ways for this progression to begin;

"In economics the harbingers of the future are those institutions that combine a clear ethos with multiple reciprocal connections, and that bring ownership and responsibility more closely into line to make it possible to pursue many different ends, rather than subordinating all activity to the ends of a global capital market." (Mulgan, 1997:17)

Mulgan proposes the term *connexity* to describe the interdependence that has arisen from the new electronic connections that span the planet. (Mulgan, 1997) However, he identifies that the features of *connexity* are experienced mainly in North America, Europe, Japan and East Asia, and for the privileged in China, India and Latin America. The rest of the world is still affected by the more recent climate of technology culture in addition to the conventional connections that have built up over centuries. Much of this activity is based on communication and exchanges, a 'social exchange' according to Mulgan. (Mulgan, 1997:72)

Mulgan claims that *connexity* should make it easy to imagine a self-organising society, one which is not obstructed by geographical boundaries. He argues that this kind of society would place a high ethical emphasis on *truth* and *responsibility*, principles of reciprocity that he considers essential to the basis of modern social orders. Mulgan suggests that *autopoiesis*, or *self-creation* is the best way of describing this potential future society and reports that this is an area being explored by contemporary systems thinking. Maturana and Varela (1992) agree with Mulgan's view since they propose that rather than only considering systems in relation to external environments, we should also see them as autonomous, circular and self-referential, concerned with their own organisation and identity.

Mulgan argues that people often feel inadequate to their social tasks, mainly due to being unprepared for an environment in which there are fewer fixed rules and certainties. He claims that the current education system treats children as passive recipients of received knowledge and that the curriculum of the future needs to provide interaction with technologies in addition to involving schools in the life of the community, so that they can make real decisions and experience real world knowledge. Mulgan proposes that;

"A curriculum fit for a more connected world would place a much greater emphasis on relationships. But it would also teach familiar subjects in a different way. Most contemporary learning is causal. In history or the sciences the priority is given to learning about linear causes...but increasingly, the world works more like a system in which elements coevolve, and more like an ecology of interacting parts. Fortunately this too can be taught. Computers make it easy to simulate the workings of a city and learn how a decision affecting one part can alter the viability of the whole." (Mulgan, 1997:143)

Mulgan argues that people should be allowed to fail, risk and take responsibility, in order to gain an understanding of the world and a mentality which is more suited to the environment of connexity. In a densely populated environment, Mulgan argues that we are dependent on healthy and well-intentioned minds, and so the cultivation of stronger more adaptable people is beneficial to both state and society in general. It is interesting to note that the skills that serve many highly technical jobs in today's society were acquired in video arcades in the 1980s. (Herz, 1997)

Bennet (2000) discusses the influence of popular music and youth culture on social identity. He reports that recent studies (Reimer, 1995; Johansson & Miegel) illustrate this argument in their results. Reimer (1995) discovered in observations with Swedish youth, that they are influenced by class, gender, education, income and civil status, but not as significantly as they are influenced by entertainment, which Reimer claims; 'exists almost independently of socio-economic background'. (Reimer, 1995:135) Johansson and Miegel (1992) suggest that taste patterns in youth entertainment cannot be explained by singular class-based or subcultural causes, and instead 'must be related to a wider spectrum of individually held values, attitudes and actions'. (Johansson & Miegel, 1992:103) Bennet (2000) attempts to understand the relationship between identity, musical taste and visual style as manifested in urban dance music and culture. He suggests that Maffesoli's concept of *tribus* (tribes) provides a useful theoretical model. Maffesoli (1995) uses the *tribus* concept to

describe the dynamic nature of collective associations between individuals in societies where consumer orientation is increasing.

Maffesoli defines 'a tribe' as:

"without the rigidity of the forms of organization with which we are familiar, it refers more to a certain ambience, a state of mind, and is preferably to be expressed through lifestyles that favour appearance and form."

(Maffesoli, 1995:98)

This concept would certainly help to explain the popularity of the *virtual cyborg* culture, identified by Harraway (1991) and the rise of online role-play gaming at the turn of the 21st century. Bennet presents an alternative view to the argument that globalisation destroys identity. He appears to support the work of Lull (1995), who proposed the term *cultural reterritorialization*, in order to illustrate how global commodities and resources are 'reworked' at local level in order to integrate their meanings into everyday environments and experience.

Lull claims that;

"the foundations of cultural territory – ways of life, artifacts, symbols and contexts – are all open to new interpretations and understandings...Because culture is constructed and mobile, it is also synthetic and multiple...Reterritorialization, therefore, is a process of active cultural selection and synthesis drawing from the familiar and the new."

(Lull, 1995:160)

Bennet's ethnographic studies (2000) offer insights into the role of popular music and its associated lifestyles, in the *local* construction of cultural meanings from *mass* cultural resources. He also stresses the context of an environment of oppressive traditional organisation in many of the observed localities. (Bennet, 2000) Bennet's claims are similar to the findings of Hendry et al (1993) who propose that peer groups, rather than being a constant in young people's lives, have a dynamic role, whose function and influence varies according to the characteristics of the immediate environment or locality.

"By experiencing the values and norms of the peer group, the adolescent is able to evaluate the perspectives of others, while developing his or her own values and attitudes. Because all groups are oriented towards fostering identity development, certain developmental trends in peer pressures can be expected to supersede group differences. Style of dress, hairstyles, musical interests, speech and language use, leisure activities and values are among the socially relevant characteristics that teenagers appear to learn, in part, by exposure to peer models. Further, teenagers learn methods of handling social relationships by observing and imitating peers. Thus peer groups act as a source of behavioural standards in some contexts, and particularly where parental influence is not strong. Peer groups offer adolescents opportunities both for role-taking and for role-modeling." (Hendry et al, 1993:123)

Hendry identifies that as adolescents mature, they are exposed to a greater number and variety of adult role models, and an increased diversity of social roles and choices. Hendry argues that because political and moral values have become more diffuse as a more pluralistic society has evolved, it has become harder for young people to select among these options. Hendry calls for a better understanding of adolescent behaviour if we are to help young people in the transition to adulthood.

Murray (2000), claims that

"the computer allows us to create objective correlatives for thinking about the many systems we participate in, observe and imagine."
(Murray,2000:93)

Murray⁶ reveals that her interest in creating 'narrative microworlds' emerged at the same time as foreign language teachers were becoming interested in creating *immersive* learning environments. Murray found that revealing a narrative alongside the language, motivated the students in their learning.

(Murray, 2000) Murray claims that although linear interactive formats (for example novels, plays and stories) are becoming more interactive and participatory, there has also been a development of new narrative formats in electronic environments. Murray identifies computer games as being the area that has made the most creative effort in advancing digital narrative, although admits that the narrative content of the games is still often underdeveloped or imported from other media. She claims that this is due to most game development being in favour of more detailed visual environments and faster response times or highly aesthetic, rendered characters that Murray considers 'stereotypical'. (Murray, 2000)

Murray claims that an important advantage of digital participatory environments is that they create the capacity to elicit behaviour that endows imaginary objects or situations with life. In digital environments, Murray reports that we can act through *avatars*, which are similar in construction to the *cyborgs*, described by Haraway (1991). Avatars provide characters that can offer alternative identities to be explored and behaviourally employed, reiterating the importance of providing a *liberatory aspect* to interactive digital media.

"Computer-based journey stories offer...a pleasure that is intensified by uniting the problem solving with the active process of navigation."

(Murray, 2000:139)

Murray claims that the most satisfying problems are those that encourage the *interactor* to apply real-world thinking to the virtual world. She is critical of the entertainment industry for being too slow in understanding what people look for in a digital environment and claims that although the giant conglomerates of this industry may have vast resources and established connections to mass audiences, that ultimately, the shape of digital narrative art and entertainment over the next few decades will be determined by an interplay between them and *independent experimenters*, who are comfortable with hypertext, procedural thought and virtual environments. Murray acknowledges that videogame

manufacturers have provided the first step in this direction by offering 'immersive visits to pleasurably explorable 3-D dreamscapes'. (Murray, 2000:263) She proposes however, that the most important element of new technology is its ability to capture experience as a process of interrelated actions;

"We are now engaged in establishing the building blocks of a procedural medium, the musical figures that may someday grow into a symphonic form. We are learning how to create characters by modeling their behaviors, how to create plots by establishing the rules by which things should happen, and how to structure the participation of the interactor into a repertoire of expressive gestures." (Murray, 2000:274)

The scenario, described by Murray, provides a potential solution to the issues of identity and social development raised by Marcuse (1964,1991), McLuhan & Powers (1989) and Mantovani (1996). It also provides an environment where people could be exposed to a variety of social problem solving situations and characters in order to experience and establish corresponding responses. This may also therefore provide an arena similar to that of peer group interaction, identified by Hendry et al (1993) and a learning environment that would satisfy both the social and technological interaction identified by Mulgan (1997) as necessary in developing strong, adaptable members of society.

One of the initial fieldwork observations (see *Chapter 4, Section 4.2*) was the dominance of male consumers of leisure software products (Cassell & Jenkins, 1998). Subrahmanyam and Greenfield (1998) raise concerns that females might therefore be at a disadvantage in computer competence precisely because they do not appear to play as many computer games as males. This study illustrates that we can no longer assume that females do not play interactive games, since the fieldwork reveals that although the girls in this study were not buying many computer games, they were still playing them, and quite regularly (see *Chapter 4 & Appendix 1.2*). Nevertheless, Subrahmanyam and Greenfield call for the development of *Androgynous Games*;

“..in recent times we have seen a rise in the number of computer games marketed exclusively for girls. This trend in computer games parallels the general trend in the toy industry toward gender-specific marketing...we would like to caution against designing girl games that stereotype “girl” interests. The ultimate challenge facing software developers is to design games that appeal to any gamer, regardless of gender.”
(Subrahmanyam & Greenfield, 1998:66)

Cassell and Jenkins also call for alternative models of software to be developed, concerned that we assume that boys and girls want different things from digital media. They quote the view of a working game designer⁷;

“What all these new girl products should have done was open up different ways the interactive medium can integrate into our free time and our social time,...What needs to happen is for girls’ games to get out of the realm of gender and into the realm of design.” (Cassell & Jenkins, 1998:24)

This study does not have the capacity to enter into a full discussion of the gender issues that have arisen throughout the growth of leisure software games. However, it is an important area, since it excludes many from participating in a *tacit learning environment* that could provide important skills and experience, necessary to interact successfully with modern society. In my view, this principle is not exclusive to the male/female question, but identifies a wider need to address the issues of all potential users in society.

The recent work of Von Krogh, Ichijo and Nonaka (2000) in their text *Enabling Knowledge Creation: How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*, they begin to address some practical ways to accomplish such an ambitious challenge in a changing environment. The authors clarify that knowledge can take many different forms and propose four factors that assist in enabling knowledge creation;

1. *Knowledge is justified true belief.* When somebody creates knowledge, he or she makes sense out of a new situation by holding justified beliefs and committing to them. Under this definition, knowledge is a construction of reality rather than something that is true in any abstract or universal way. The creation of knowledge is not simply a compilation of facts but a uniquely human process that cannot be reduced or easily replicated. It can involve feelings and belief systems of which one may not even be conscious.

2. *Knowledge is both explicit and tacit.* Explicit knowledge can be put on paper, formulated in sentences or captured in drawings. Tacit kinds of knowledge are tied to the senses, skills in bodily movement, individual perception, physical experiences, rules of thumb and intuition. Tacit knowledge, although difficult to describe, has great value and is a potential source of innovation.

3. *Effective knowledge creation depends on an enabling context.* An enabling context is 'a shared space that fosters emerging relationships'. This is based on the Japanese concept of *ba* (or "place"), which can be physical, mental, virtual or, most likely, all three. This 'knowledge space' is necessary for the process of knowledge creation.

4. *Organizational knowledge creation involves five main steps.*

1. Sharing tacit knowledge
2. Creating concepts
3. Justifying concepts
4. Building a prototype
5. Cross-leveling knowledge⁸

(Von Krogh, Ichijo & Nonaka, 2000:6-7)

Von Krogh, Ichijo & Nonaka also stress the importance of *knowledge enabling* being considered as a circular process. Five *knowledge enablers* are also specified which all have a strong influence on cross leveling of knowledge, by increasing dissemination of information and overcoming barriers to communication. These are:

1. Instill a knowledge vision
2. Manage conversations
3. Mobilise knowledge activists
4. Create the right context
5. Globalise local knowledge

(Von Krogh, Ichijo & Nonaka, 2000:8)

'Managing conversations' was found to be a key component in knowledge creation. The authors found that a caring atmosphere (where members take an active interest in the insights of others) along with effective conversations, allowed for a higher creativity level, stimulated the sharing of tacit knowledge, concept creation and justification, and subsequently assisted the flow of knowledge across organisational levels, providing essential information for developing a powerful prototype (Von Krogh, Ichijo & Nonaka, 2000). The authors also report that companies are beginning to recognise the importance of *knowledge* or *intellectual capital* (ibid, 2000:11), and have observed a number of different motives for starting knowledge initiatives. The motives were found to fall into three broad types; *risk minimisers*, *efficiency seekers*, and *innovators*. *Risk minimisers* tend to focus on the contents of knowledge and emphasize existing knowledge that is useful for solving identified problems within the company or organisation. *Efficiency seekers* try to make identified existing knowledge easily accessible to the whole organisation and find new uses for that existing knowledge. The main aim here is to transfer experiences and best practice throughout the company in order to reduce costs by reproduction of knowledge creation.

The tacit aspects of knowledge become evident in these circumstances and these companies tend to also investigate the knowledge-transfer process. *Innovators*, according to Von Krogh, Ichijo and Nonaka (2000), focus both on new knowledge and on knowledge processes. They engage and motivate people and create an enabling context for knowledge creation.

"As *knowledge activists*...these managers take a strategic view of knowledge, formulate knowledge visions, tear down knowledge barriers, develop new corporate values like care and trust, catalyze and coordinate knowledge creation, manage the various contexts or *ba* involved, develop a strong conversational culture, and globalize local knowledge."

(Von Krogh, Ichijo & Nonaka, 2000:262)

Innovators are exactly what are needed to tackle the issues currently facing social and technological developments. Perhaps the answers lie in the future in the hands of young people still exploring these environments. In *Chapter 2*, with reference to social development (section 2.1.4), the proposals and opinions of Sylwester (2003) are reviewed. These provide potential guidelines in addition to those of Von Krogh, Ichijo and Nonaka (2000) on how to enable innovation to deal with the serious moral, political, economic, and cultural issues that are confronting our society.

Sylwester's proposal for learning in the environment of an 'extended laboratory' could arguably provide learning in how to make social decisions. In fact, this context could be applied to *Leisure Software Concept 4: GAIA / Virtual Contax*, proposed in Chapter 4, section 4.12.5, which was created with a focus group participating in this study.

Sylwester's observation that today's youngsters have to master cyber space and time in addition to natural space and time, makes them essential participants in developing a future culture of '*collaboration for innovation*', in which decision-making and exploration are encouraged. If we usefully and

genuinely involve the young, then we foster an environment that is most likely to be innovative, since consideration would be given to all knowledge rather than just established paradigms. Sylwester's argument that it is 'the reciprocal process of apprenticeship' that will lead us toward greater success in using technology to enhance the learning experience (Marcinkiewicz & Sylwester, 2003), makes a lot of sense in the context of future social and technological development.

1.2.2 Designing for Inclusivity

The relevance of User and Stakeholder participation in the Design Process is an important area that has received much discussion in the fields of design, social science and human computer interaction. This section discusses this design approach particularly in relation to potential social and technological development.

Norman (1988, 2002) discusses the concept of *affordance*, which refers to the perceived and actual properties of something that determine how that thing could be used. Norman's clarification of affordance is that;

'A chair affords ("is for") support and, therefore, affords sitting.'

(Norman, 1988,2002:9)

and

'...affordances result from the mental interpretation of things, based on our past knowledge and experience applied to our perception of the things about us.' (Norman, 1988,2002:219)

Clearly this example refers to the material world, but affordance is equally applicable in a technological and virtual context. If people can clearly see what something 'is for', whether in a physical or mental context, then it could be argued that the potential for interaction with it is more likely. Additionally, if

people help to design what something is for, then they have even more investment in its eventual use.

Bucciarelli's (1994) claim that design *is* a social process, refutes the trend of fixation on the physics of a device that has dominated much technological development to date. Object-world thinking (Bucciarelli, 1994) does little to advance the production of socially beneficial artifacts.

The *utilitarian or consequentialist*⁹ vision of who and what should determine the form and function of technology, takes into account the impact of social context and historical setting. However, design that starts from the marketplace and lets the consumer exercise their choice by becoming the decision makers in the process, needs to remain aware of external environments and contexts in addition to internal influences and beliefs.

If we are to use technology to build systems that will be socially advantageous, then we need to consider the different interpretations of the *purpose, reason or use*, of that system before we begin to design in any detail. I believe that these factors can only be deduced by accessing users and stakeholders of potential systems, in order to convert their disparate views, with consideration for the relevant context, into a meaningful concept or representation that allows for inclusion of all factors, in other words; *Designing for Inclusivity*.

It should be made clear that the above context itself requires clarification.

The term *system* is used to describe both social and technological forms of organisation or representation. Today, much administration of social living is not only situated in the context of a system that consists of people, but is also reliant on a system of technology that supports that social system (Kawalek & Leonard, 1996). Local government is an example of this, as is the education 'system'. Every user of a system has their own unique perspective of that system and can quickly identify problems that arise for them, as well as probably imagine useful scenarios that would assist them in their use of that

system. An example, given in Chapter 2, from the *Schools of the Future* report, illustrates this:

"I can imagine a scenario where people carry small hand-held devices which ... connect to the Web or larger display units or keyboards."

(A primary school teacher, 2002)¹⁰

This example of user input, sounds like an accessible, and potentially inclusive environment to learn in, and it is interesting to observe that there are already products¹¹ on the market that could allow such portable transportation of information and creative content, however, clearly these artifacts are not in daily use in primary schools yet, perhaps because of limited financial resources, but also because they have not been integrated into mainstream educational thinking and practice. Ideas like this, from users, can however often highlight sometimes obvious solutions to system problems. There is still a long way to go, in terms of inclusive design, with many obstacles and challenges remaining in today's technological environment.

1.3 The research focus

The original contribution of this thesis is:

A concept generation technique designed to promote inclusive access to technology, individual learning and social development through play.

This thesis proposes that the following are crucial elements of the technique:

Access to technology for a wider proportion of the population (*inclusivity*)

Competence and

Congruity with technology

Education & Individual learning

Social development

Social & technological advantage

In addition, one of the design concepts proposed, provides a classification model for leisure software products. This could be very useful in providing inclusive access to all areas of technological development as well as for mapping the changing interests of users connected in virtual space.

1.4 The research methodology

Having already established that the original computer systems and games were designed by the computer literate for their own use, there was an interesting development during the microcomputer revolution of the 1970s. At that time the number of users of personal computers (PCs) both in the work place and in homes rose due to the innovation of the microchip and the user population expanded during this era to include all kinds of people. Out of this more widespread interaction between humans and computers, discrepancies between users' expectations and the systems that had been designed became more apparent and prolific. These discrepancies were the focus of certain researchers throughout the world and gradually the research discipline of Human Computer Interaction (HCI) emerged to begin to address the specific problems. This study sits firmly within the HCI research discipline.

1.4.1 Human Computer Interaction

- Has a multidisciplinary background.
- Has a relatively short history (about 30 years) as an independent research discipline.
- Is neither the study of humans nor the study of technology, but the bridging between those two disciplines.
- Is very much an applied discipline to provide knowledge and methods for the design of usable computer systems within a social and organisational context.

The success or failure of computer systems is reliant on understandable and efficient user interfaces.

The discipline needs to establish a body of knowledge and ensure that this knowledge is applied successfully by designers and developers of computer systems including games. Currently there is no consensus over any accepted research strategy or methods within the wide range of disciplines that make up the field of Human Computer Interaction. The effect of this situation is that for each specific study under investigation, the individual researcher has to decide how to proceed on the basis of previous research undertakings within the domain of study and by carrying out as comprehensive a review of the available published methods as possible. Figure 1.4, illustrates the range of different domains that contribute to the discipline of human-computer interaction.

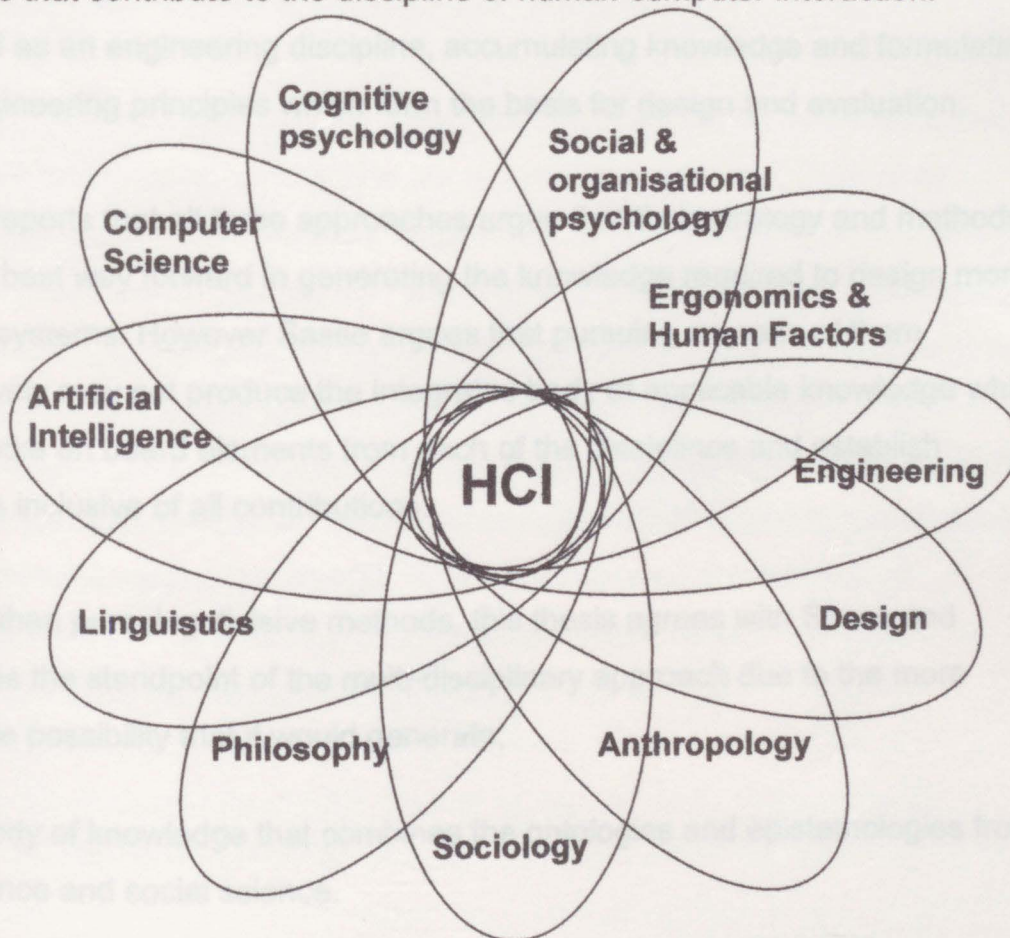


Figure 1.4 Arts and Science disciplines that contribute to Human Computer Interaction. Illustration from: Preece (1994)

Sasse (1997) reviews the history and nature of the HCI discipline in her thesis, *Eliciting and Describing Users' Models of Computer Systems*. She concludes that there are three different views of how to carry out research in order to advance the discipline;

1. HCI as a traditional science tempered by approximation, providing engineering-style theories and tools for designers.
2. HCI as a design science, developing a craft-based approach and new research methods to evaluate existing systems in their intended and tasks context, using the results to inform designers for the next generation of systems.
3. HCI as an engineering discipline, accumulating knowledge and formulating engineering principles which form the basis for design and evaluation.

Sasse reports that all three approaches argue that their strategy and methods are the best way forward in generating the knowledge required to design more usable systems. However Sasse argues that pursuing any one of them exclusively may not produce the integrated body of applicable knowledge which would take on board elements from each of the disciplines and establish theories inclusive of all contributions.

Rather than pursuing divisive methods, this thesis agrees with Sasse and assumes the standpoint of the multi-disciplinary approach due to the more probable possibility that it would generate;

- A body of knowledge that combines the ontologies and epistemologies from science and social science.
- Theories and tools which support designers to produce usable systems
- Successful application of this knowledge in designing new technology

This approach is more forward-looking and creative rather than prescriptive and/or predictive. Obviously, the discussion and debate over relevant theories and models will continue, but it seems apparent in the context of this study that all relevant disciplines need to be included in the debate. However, having made a case for a multi-disciplinary approach, the design discipline itself, which appears to receive little support as a problem-solving arena despite centuries of experience, is ironically rejected by Sasse (1997) with the argument that HCI knowledge cannot be accumulated in the form of designed systems since:

"we know that the design of a system is influenced by considerations other than usability; economic (e.g. marketing) and legal (e.g. copyright) considerations play a substantial role in the conception, design and development of systems." (Sasse, 1997:Ch2, p10)

While not disagreeing totally with this statement, it should be made clear that economic and legal considerations are relevant in the development of all systems, whether from a science, engineering or design discipline, and whether they are produced for commercial, social or educational reasons. Additionally, since HCI is a multidisciplinary field, surely the expertise of designers, who are key people in conceptual problem solving, is as relevant as that of engineers, ergonomists, or any of the professionals included in making a system work. Any possible solutions should be considered equally until it is established whether they are useful, relevant and valid. The most important thing is that all disciplines within HCI work together, respecting each other's specialities, in order to advance the usability and potential of technology.

1.4.2 Grounded Theory

Both quantitative and qualitative research deserve an important place in developing the discipline of HCI, since observations and detailed descriptions of phenomena provide the foundations of any research activity.

In order to utilise and progress from these descriptions, it is necessary that they form the first step of a theory-building process. Theories provide the most systematic way of building, synthesising and integrating scientific knowledge. (Strauss & Corbin, 1990) Thus, observations and results of specific evaluations must be used as a basis for the formulation of HCI theories. (Sasse, 1997) This leads to the proposal of Grounded theory (Glaser & Strauss, 1967) as a research methodology for this particular study.

"Grounded theory refers to a specific methodology on how to get from systematically collecting data to producing a multivariate conceptual theory." (Glaser, 1967, 1999:836)

According to Strauss and Corbin (1990) grounded theory is designed to build rather than only test theory and offers the route of data-analysis-theory instead of the theory-hypothesis-test route offered by traditional science. Grounded theory is therefore inductive rather than deductive. According to Sasse (1997), grounded theory;

"...offers a framework for deriving theories from observations which exactly fits HCI's requirements..... Theories constructed in this manner can not only be used to explain observations, but also provide a framework for deriving subsequent action, which suits the applied nature of HCI." (Sasse, 1997: Ch2, p11)

Any specific research undertaking has to begin by establishing existing knowledge of the phenomenon under investigation. The research topic of this thesis is *Product Development in the Leisure Software Industry: a design methodology for the development of Inclusive Interactive Digital Media*. Since no established research method was identified for this context at the initial literature review, grounded theory was considered the best research method available to provide a way of deriving theories from data relevant to the domain of study, in the context of HCI.

Grounded theory develops through the 'comparative method'. To do this it is necessary to study the same event or process in different situations and thus identify new cases, settings and areas of otherwise unidentified interest. This investigation studies the design process for computer games within different settings or situations.

Glaser and Strauss (1967) propose two main criteria for evaluating the quality of a theory. First, it needs to be analytic to enable some generalisation to take place, and secondly it needs to be sensitising, so that people can relate the theory to their own experiences and perceptions. As Jones (1987) comments, grounded theory works because:

"Rather than forcing data within logico-deductively derived assumptions and categories, research should be used to generate grounded theory, which "fits" and "works" because it is derived from the concepts and categories used by social actors themselves to interpret and organise their worlds." (Jones, 1987: 25)

This study does use 'deductively derived assumptions', which are all derived from the initial questionnaire results and therefore reflect the concepts and categories of the user group under study. This is important in order to view the domain in that sensitising way that Glaser and Strauss identify as fundamentally important to any theory development.

1.4.3 Research Methods Used in this study

Under the overall guidance of Grounded Theory the main research methods used in this study are; stakeholder participation, questionnaires, focus groups and generative research and tools. Details of how these were applied are illustrated in *Chapter 4: Fieldwork: Accessing Potential Users*. Also used in this study, are some of the more specific research methods; constant comparison,

inductive and deductive analysis, conjoint analysis, bivariate and multivariate analysis and finally cluster analysis. These methods lead the analytical processes that allow for generalisation, providing a way of deriving subsequent theory from observations. The theory constructed can then be used to explain observations, in addition to providing a framework for identifying subsequent action. The *research methodology* should not be confused with the *design methodology* that developed during chapter 4, although the application of these research methods as part of the design analysis, illustrates that there are clear overlaps in utility of these methods between the design and research disciplines. Not surprising, since analytical thought is an important part of the process of both.

A brief description of the more specific analytical methods utilised follows, with some references to particular examples of application illustrated in chapter 4.

1.4.3.1 Constant Comparison

Constant comparison is a strategy for identifying items within a research investigation. It was initially introduced by Glaser and Strauss in 1965 in a study of death and dying in a hospital. Their analysis records the stream of behaviour or language and then separates these into discrete concepts using constant comparison to put them into categories. Subsequent steps link the categories into concepts or theoretical constructs that permit selection or development of theories to explain what is observed.

Systematic analytic induction is a specialised form of comparison which has as its principle feature of emphasis the ability to search for negative or disconfirming cases. Finding items that are similar to each other is relatively easy, and often confirms a researcher's insights or hunches. However analytic induction helps the researcher to identify omissions that they thought should be present in addition to omissions that they had not anticipated.

1.4.3.2 Conjoint analysis

1.4.3.2 Inductive and deductive analysis

Induction is generally the inference from a finite number of particular cases to a further case or to a general conclusion. (Mautner, 2000)

"Aristotle introduced the concept of induction in the *Posterior Analytics*. It has been claimed, however, that there, induction' does not mean a process of reasoning, but the examination of instances that results in a common feature coming to view." (Mautner, 2000:273)

It is the Aristotelian concept of induction that is most relevant to this thesis. This will be illustrated in *Chapter 4: Fieldwork: Accessing Potential Users* during the process of examining the existing components of software games.

The traditional concept of 'deduction', on the other hand is a valid inference from *necessary* premises. Descartes defined it as an operation by which we have insight into something which follows necessarily from other things that are known with certainty. (Ibid: 124)

In a modern context, a valid deduction or a valid deductive inference is one in which the conclusion is a necessary consequence of the premises, so that the conclusion cannot be false if all the premises are true.

The classic Aristotelian concept of 'deduction' is as a valid inference from more general premises to a less general, i.e. a more specific conclusion. It is contrasted with induction, which is an inference from particular instances to a general conclusion.

1.4.3.3 Conjoint analysis

Conjoint analysis can provide valuable information for new product development and forecasting, market segmentation and pricing decisions. The technique can be used to answer a wide number of questions about the features and attributes of a product that drive the purchasing decisions of the users.

The specific questions to be answered in this study are detailed in chapter 4; Fieldwork; accessing potential users, and will be discussed there. In general terms, conjoint analysis introduces consumers or users to a range of features or attributes of a product and then asks them to make judgements or trade-offs to determine their final purchase preferences. These preferences are then analysed to determine the combination of attributes that will be most satisfying to the user or user group. This allows the researcher to predict what will be most appealing to a specific market segment by identifying a range of attributes, based on user preferences, which can substantially aid the design of a new product or service.

This technique was particularly useful in this study since it could be used to identify possible market opportunities by exploring the potential product features or combinations of features that were not currently available within software games. In addition, conjoint analysis can be used to identify and suggest the best marketing strategies for a product or service by identifying the features that are most important for that particular product with a potential user group.

1.4.3.4 Bivariate analysis

Using statistical techniques to associate two variables is referred to as bivariate analysis. This form of analysis allows the researcher to examine the preference of a user between two opposing ends of the spectrum for one item. This method helps to establish and reveal intragroup variation for particular attributes under investigation.

1.4.3.5 Multivariate analysis

Statistical techniques that associate groups of variables or more than two variables is referred to as multivariate analysis and allows for a similar analysis as bivariate, but the results are spread over a wider range of variables. This form of analysis is particularly used in this study to produce an illustrative diagram of different group's psychological profiles in relation to particular attributes of the study.

1.4.3.6 Cluster analysis

This method allows for analysis and mapping of the position of different groups within a diagrammatic illustration of the set of variable attributes under investigation. Cluster sampling involves identifying the natural groups or settings in which a population can be found, listing those groups or settings, and sampling these rather than sampling a group of individuals. The units of analysis, then, become all of the individuals found within the specific clusters in the sample. (Schensul, Schensul & LeCompte, 1999) All of the above research methods are illustrated, with examples from the empirical research, in *Chapter 4: Fieldwork: Accessing Potential Users*.

Research disciplines have to begin somewhere to build a theory on which they can be reliably based. This process can surely only happen once several starting points have been identified and established:

The qualitative data generated from the initial questionnaires was organised into factors, subfactors and variables (or attributes). These attributes were then used as components of a tool kit that could be used to investigate the responses at focus group level. These responses became useful for further investigation at advanced tool kit level. The quantitative data that was obtained was then organised in the form of scales and indexes representing the same

variables (or attributes). The meeting of these two comparable data sets at the factor and subfactor level provides the opportunity for both triangulation and integration.

Schensul, Schensul and LeCompte (1999) propose simply that theory refers to the relationships between facts. This equates to the ordering of facts in some meaningful way. Theory is what makes sense of observations, statements, events, values, perceptions and correlations. It is what transforms facts into a hypothetical description of a given time and place, which can then be used to predict, explain or test similar events in another time and/or place.

An ancient Chinese view adds another interesting slant on the discussion. This quote illustrates how differing perspectives might be applied to any methodology of research and how the researcher's perspective can itself either illuminate or restrict the study;

"The manner in which the I Ching tends to look upon reality seems to disfavour our causalistic procedures. The moment under actual observation appears to the ancient Chinese view more of a chance hit than a clearly defined result of concurring causal chain processes. The matter of interest seems to be the configuration formed by chance events in the moment of observation, and not at all the hypothetical reasons that seemingly account for the coincidence. While the Western mind carefully sifts, weighs, selects, classifies, isolates, the Chinese picture of the moment encompasses everything down to the minutest nonsensical detail, because all of the ingredients make up the observed moment."

(Jung, 1949)¹²

This study revealed that there was no established methodology for the production or development of software games and therefore endeavored to build one. This proved useful since it provided a process that could be developed and tested in order to attract users that had little previous interest in accessing technology through play.

Grounded theory provides the process to develop theory from data.

Data collection and analysis proceed simultaneously. The process and products of the research are then shaped from that data, rather than from any preconceived theoretical frameworks. The process involves a seven-stage analysis according to Easterby-Smith, Thorpe and Lowe (2002). These stages are:

Familiarization

Reflection

Conceptualization

Cataloguing concepts

Re-coding, linking

Re-evaluation.

It is also recommended that a critical peer group is useful in the early stages of data collection and analysis in order to suggest new categories as well as assist with interpretation. This study did have such a peer group, but also importantly, collected this information from the respondents under investigation.

"In short: methodology should not be a fixed track to a fixed destination but a conversation about everything that could be made to happen."

(Jones, 1970,1980:73)

This concept is an important one in producing relevant theories, particularly where new or unexplained phenomena are under investigation. It is essential to have an open mind about the results of a study in order for the theory to emerge from the data itself. Preconceived results may or may not become reality.

These should not detract from issues raised in the study that were not predicted or even identified prior to the research undertaking. It was found in this study, that attributes and user preferences were identified that had previously been unrecognised as important, particularly with reference to the specific user group

under investigation. These attributes became key factors in moving the development process forward to attract wider user participation.

The next chapter reviews some of the relevant psychological influences on human behaviour, in order to begin to comprehend the wide range of factors that contribute to the way that humans are motivated, play, learn and develop, both independently and socially. Knowledge acquired from the field of psychology will substantially assist any designer or design process and is a valuable resource of empirical and theoretical research.

¹ A market segmentation analysis carried out by Continental Research in March 1999.

² Figures published by Screen Digest in association with the Entertainment & Leisure Software Publishers Association (ELSPA) in *Screen Digest: Interactive Leisure Software Report 4th edition* (2003) *Global market assessment and forecast to 2006*. Available from the Screen Digest website (www.screendigest.com).

³ New Screen Digest report, published in association with ELSPA;

⁴ "European Interactive Games – The 2005 State of the Industry Report."

⁵ *Totalitarian / Totalitarianism n.* the total control of all aspects of life that are actually or potentially of political significance. The term was first used in the 1920s by Italian fascists for their own political goals, and later applied to Nazism and to Soviet communism. The word began to be used pejoratively in the 1940s. (Mautner, T. 1996, 2000:567 *The Penguin Dictionary of Philosophy*)

⁶ 'The left side of the upper brain has a very specialist role. It is largely concerned with linguistic matters, the ability to order, to quantify, to label. The right side of the neo-cortex is best in spatial tasks, the sense of the multi-dimensional... The left hemisphere prefers units of neural information which can be said to be "similar" and focal, whereas the right brain area favors unintegrated units of data.' (McLuhan & Powers (1989:50)

⁷ Janet H. Murray is Director, Program in Advanced Interactive Narrative Technology (PAINT) and Senior Research Scientist, in the Center for Educational Computing Initiatives at the Massachusetts Institute of Technology.

⁸ Heidi Dangelmaier from Weil, 1997.

⁹ The five phases were originally defined by Nonaka and Takeuchi (1995)

¹⁰ *Utilitarianism. n.* a moral theory according to which an action is right if and only if it conforms to the principle of utility. Bentham formulated the principle of utility as part of such a theory in *Introduction to the Principles of Morals and Legislation* 1789. According to Bentham, an action conforms to the principle of utility if and only if its performance will be more productive of pleasure or happiness, or more preventive of pain or unhappiness. A characteristic feature of Bentham's theory is the idea that the rightness of an action *entirely* depends on the value of its consequences. This is why the theory is also described as consequentialist. Since the 1960s, many writers have used *consequentialism* instead of *utilitarianism* for the view that the rightness of an action *entirely* depends on the value of its consequences. (Mautner, T. 1996, 2000:582 *The Penguin Dictionary of Philosophy*)

¹¹ DfES & NgfL (2002) *Transforming the Way We Learn. A vision for the Future of ICT in Schools.* – 'The School of the Future' p25

¹² For example, *Iomega Mini USB Drives*, which plug into any USB port and allows files or presentations, graphics, photos, music and video to be transferred and transported. The unit is designed the size of a key ring, is available in 64Mb, 128Mb & 256Mb capacities and costs under £25. Ref: *Jigsaw Digital Tools* issue 49M

¹³ From the foreword by C.G. Jung, written in Zurich, 1949, of Richard Wilhelm's 1968 translation of *the I Ching* (3rd edition).

2 Motivation, Play, Learning and Social Development.

2.1 Literature Review

As stated in the introductory chapter, it was decided to review the psychological literature covering this subject chronologically, wherever possible, in order to obtain an understanding of the gradual evolvement of theories over a period of time. This has been achieved by reviewing the earliest theories and considering these together with later related theories within each of the areas of motivation, play, learning and social development, using the comparative method of grounded theory. It is not within the scope of this thesis to cover all of the literature in this vast field, however what has been reviewed illustrates the important potential of integrating knowledge from different domains of research to the discipline of human-computer interaction and the future design of inclusive interactive digital media.

2.1.1 Motivation

One of the earliest theories regarding motivation is that of the British philosopher, Thomas Hobbes (1588-1679), who maintains that the natural situation of human beings is something he calls 'The Law of Nature'.

"That is the fundamental Law of Nature to seek peace where it may be had, and where not, to defend ourselves."

(Hobbes, 1651, 1983:53)¹

Hobbes claims that everyone pursues happiness as they understand it. No single concept of this is shared, since it is a matter of the continual satisfaction of desire, which is different for each person. Hobbes argues that people

naturally exercise their 'right of nature' to pursue happiness or 'peace' as they see it and that they judge for themselves how best to get what they want. He concedes that most of this is driven by unspoken laws rather than laws that are written down.

"The Lawes of Nature oblige only in the Court of Conscience."

(Hobbes, 1651, 1983:61)

The pursuit of happiness is similar to the '*pleasure principle*²', which maintains that all behaviour is determined by the seeking of pleasure and the avoidance of pain. This behaviour is immediately apparent in young children as they develop their abilities and begin to explore their environment, yet it remains in us all as we mature.

All of the major theoretical approaches in psychology attempt to explain the root causes or motives of human behaviour. The tendency to seek pleasure and avoid pain were also important in Freud's psychoanalytic theory, where the pleasure principle rules the Id, but is partly repressed by the 'reality principle'. (Freud, 1927)

"Freud started with the assumption that human behaviour is determined by the amount of pleasure or pain to which it leads. Pleasurable experiences are sought, painful ones avoided."

(Millar, 1968:25)

Freud (1856-1939) initially specialised, as a doctor, in neurological disorders. Most of his psychoanalytic theory was produced between 1900 and 1930. He originally tried to explain the mind's workings in terms of physiology and neurology, but realised quite early in his treatment of neurological patients, that symptoms which had no organic or bodily basis could imitate real physiological and neurological symptoms. Freud then began searching for psychological explanations for these symptoms and ways of treating them.

Freud collaborated with Josef Breuers (1842-1925) to develop a method of allowing patients to 'talk out' their problems, calling it 'free association'. This became one of the fundamental tools of psychoanalysis. (Millar, 1968)

Freud believed that the personality consisted of three parts, (which he stressed were not physical parts) the *id*, the *ego* and the *superego*. He saw psychoanalysis as an instrument to enable the ego in its conquest of the *id*. However, he also identified that the ego is constantly menaced by three dangers, from the external world, from the libido of the *id*, and from the severity of the super-ego. (Freud, 1927, 1949)

Freud assumed a basic instinct, 'eros' or 'libido', an 'urge to live' as the source of all motivation. To him it included all manifestations of striving for pleasure. Part of it however, is checked, transformed and redirected by the necessity to come to terms with reality. (Millar, 1968)

The *id* responds directly to these instincts, the demands arising from within the person. Since the *id* is in close touch with the body and is not affected by logic, it is said, by Freud, to be governed by the *pleasure principle*. The *id* can therefore be thought of as the infantile part of the personality, before any social influence has had effect. The *id* retains its infantile character throughout our lives, any impulsive, selfish or wishful thinking is initiated by the *id*. (Freud, 1927, 1949) Some reflexes release the tension built up by impulses arising from the body's needs, for example, blinking or sneezing. However, not all impulses can be satisfied by reflex action, for example hunger cannot automatically produce food, instead it produces irritability and crying in a baby or child. The signals in the case of hunger have to be interpreted by another person, in order that the child can be fed. If the *id* were capable of satisfying all of its needs in a reflex way, there would be no need for psychological development, so frustration and discomfort are therefore necessary for development beyond the reflex level. A form of thinking; the *primary process*, occurs in the *id*, to form an

image of the object needed to reduce tension. However the *ego* is the part that is concerned with how to obtain that object.

The ego is the rational and logical part of us, which engages in *secondary process thinking*. This thinking is roughly equivalent to the cognitive processes of perception, attention, memory, reasoning and problem-solving. The ego is able to distinguish between a wish and reality, subjective and objective and is governed by the *reality principle*.

"The ego has the task of bringing the influence of the external world to bear upon the id and its tendencies, and endeavours to substitute the reality-principle for the pleasure-principle which reigns supreme in the id. In the ego perception plays the part which in the id devolves upon instinct. The ego represents what we call reason and sanity, in contrast to the id which contains the passions..."

(Freud, 1927, 1949:29-30)

Once the *superego* has developed, according to Freud, we can describe the person as a moral being, that is, someone who has internalised a set of moral values which determine and distinguish whether a certain behaviour is right or wrong, good or bad. The superego represents the moral part of the personality and comprises two components; the conscience, which threatens the ego with punishment (in the form of guilt) for bad behaviour; and the ego-ideal, which promises the ego rewards (in the form of pride and high self-esteem) for good behaviour.

"From the point of view of morality, the control and restriction of instinct, it may be said of the id that it is totally non-moral, of the ego that it strives to be moral, and of the super-ego that it can be hyper-moral and then becomes as ruthless as only the id can be."

(Freud, 1927, 1949:79)

Freud believed that conflict between the id, the ego and the superego is inevitable. He believed that the superego develops in order to assist the ego in keeping the powerful id in its place. The ego is caught in the middle between the id, the superego and reality. It has to find ways of satisfying all demands and prioritising some at the expense of others. Freud believed that this leads to behaviour that is a compromise and could take three major forms; dreams, neurotic symptoms and defence mechanisms, in order to 'satisfy' demands from the id or the superego.

"The ego develops from perceiving instincts to controlling them, from obeying instincts to curbing them. In this achievement a large share is taken by the ego-ideal, which indeed is partly a reaction-formation against the instinctual processes in the id." (Freud, 1927, 1949:82)

Freud described dreams as a disguised fulfillment of suppressed or repressed wishes. Dreams represent a compromise between forbidden urges and their repression. Dream interpretation can unravel the wish from the manifest dream content and provide invaluable information about the unconscious mind of a person. Neurotic symptoms have much in common with dreams. They are essentially the expression of a repressed wish (or memory) that has become disguised in different ways. (Freud, 1900,1953) Most of Freud's patients were suffering from 'hysterical conversion neurosis', where emotional energy is converted into physical energy, so that the problem is manifested in conspicuous symptoms. (Freud, 1906-08,1959) Defence mechanisms are used by the ego in the face of inevitable conflict. The defence mechanisms are unconscious and share the characteristic of involving some degree of self-deception. Nevertheless, the defences help people to deal with anxiety or with being overwhelmed by temporary threats or traumas. They can provide 'space' or time in which a person can come to terms with conflict or find alternative ways of coping. However, defence mechanisms are not considered to be healthy as long term solutions to problems. Some of the major defence mechanisms are; repression, displacement, denial, rationalisation, reaction-

formation, sublimation, identification, projection, regression and isolation.
(Freud, 1900, 1953 & 1906-08, 1959)

This thesis does not have the scope to cover all of Freud's theories in full, nor does it attempt to do so. However, this basic understanding of Freud's beliefs does help to introduce some of the ideas behind his work and theories. His theory of play is discussed in the next section of this chapter.

Around the same era as Freud, Alfred Adler was developing his theory of *Individual Psychology*. He claimed that;

"Individual psychology covers the whole range of psychology in one survey, and as a result it is able to mirror the indivisible unity of the personality."
(Adler, 1923: v)

Adler saw people as being motivated primarily by the drive towards affirmation of their personality, the *will to power* or *striving for superiority*. Adler believed that because children spend their early years being dependent on others and appear to experience all kinds of desires which cannot be satisfied, adults, to a child, seem to have more power to achieve their desires. Adler argued that children come to experience this dependence and powerlessness as a state of *inferiority* relative to adults. In reaction to this, an unconscious drive emerges towards *superiority*, or the *will to power*.

"In consonance with our earliest conclusions, dreams are seen with increasing clearness to be a preparation for confronting some problem which has presented itself, in accordance with the desire for superiority, and by means of an analogy." (Adler, 1923: vi)

Adler also states that:

"The conclusion thus to be drawn from the unbiased study of any personality viewed from the standpoint of individual-psychology leads us to

the following important proposition: *every psychic phenomenon, if it is to give us any understanding of a person, can only be grasped and understood if regarded as a preparation for some goal.*" (Adler, 1923:4)

He expands on this theory by going on to speak of 'a general goal of man', and argues that 'we can best understand the manifold and diverse movements of the psyche' as soon as we recognize the '*general pre-supposition*, that the psyche has as its objective the *goal of superiority*'. (Adler, 1923:7)

Adler (1923) identified three major ways, or *compensatory dynamics*, in which people attempt to overcome their feelings of inferiority;

1. *Successful compensation* – compensating in a positive and constructive way which is socially advantageous for the individual.
2. *Overcompensation* – trying too hard, aiming for extraordinary achievements and settling for nothing less. Such goals may only be fantasy and this can result in maladjustment.
3. *Escape from combat* – a way of ensuring that failure is impossible or minimal, but at the price of any real success.

Adler's individual psychology is criticised by Brown (1961) for his over-emphasis of the role of inferiority. Brown argues that it is difficult to believe that *all* non-organic nervous disorders (neuroses) are produced by feelings of inferiority or that all psychoses are the result of complete failure to conquer inferiority.

Both Freud and Adler appear to describe a constant striving from within a person for a balance, that somehow satisfies both physiological and psychological desires or imbalance. Cannon (1929,1932) used the term *homeostasis*³, to describe the process by which an organism maintains a balance in its internal bodily environment. (Cannon, 1932:24)⁴

"The constant conditions which are maintained in the body might be termed *equilibria*. That word, however, has come to have fairly exact meaning as applied to relatively simple physico-chemical states, in closed systems, where known forces are balanced. The coordinated physiological processes which maintain most of the steady states in the organism are so complex and so peculiar to living beings – involving, as they may, the brain and nerves, the heart, lungs, kidneys and spleen, all working cooperatively – that I have suggested a special designation for these states, *homeostasis*. The word does not imply something set and immobile, a stagnation, it means a condition – a condition which may vary, but which is relatively constant." (Cannon, 1932:24)

When a state of imbalance arises, the body must 'do' something to rectify the imbalance and this is achieved sometimes through a physiological action, for example sweating when the body is overheating. However, in the case of an imbalance which is caused, for example, through hunger or thirst, the body must behave in a way so that food or drink may be obtained. This is where the concept of Cannon's *homeostatic regulation* is most relevant. Tissue need, leads to internal imbalance, which leads to homeostatic adjustment or drive, which leads to appropriate behaviour, which leads to restoration of internal balance, which leads to drive reduction as the tissue need is satisfied.

Cannon's theory is purely a physiological theory, where as the concept of *need* proposed by Murray (1938) is useful in understanding the *why* of human behavior. Murray attempted to identify all the different kinds of motives, which he called needs, in his work exploring personality.

Murray's definition of need offers a detailed level of explanation;

"A need is a construct (a convenient fiction or hypothetical concept) which stands for a force (the physico-chemical nature of which is unknown) in the brain region, a force which organizes perception, apperception, intellection, conation and action in such a way as to transform in a certain

direction an existing, unsatisfying situation. A need is sometimes provoked directly by internal processes of a certain kind (viscerogenic, endocrinogenic, thalamicogenic) arising in the course of vital sequences, but more frequently (when in a state or readiness) by the occurrence of one of a few commonly effective press (or by anticipatory images of such press). Thus, it manifests itself by leading the organism to search for or to avoid encountering or, when encountered, to attend and respond to certain kinds of press. It may even engender illusory perceptions and delusory apperceptions (projections of its imaged press into unsuitable objects). Each need is characteristically accompanied by a particular feeling or emotion and tends to use certain modes (sub-needs and actones) to further its trend. It may be weak or intense, momentary or enduring. But usually it persists and gives rise to a certain course of overt behaviour (or fantasy), which (if the organism is competent and external opposition not insurmountable) changes the initiating circumstance in such a way as to bring about an end situation which stills (appeases or satisfies) the organism." (Murray, 1938:123-124)

In other words, a need represents a force within us, which acts as a motivator to organise and direct our perception, memory, thought and action so as to reduce dissatisfaction and increase satisfaction. Needs (or motivators) may be aroused by internal states, such as hunger, or they may be provoked by external stimulation, such as the sight of food.

Murray claims that our behaviour reveals certain 'trends' (or effects) that can be observed objectively and compared with the 'effects' which a subject says that they intend to achieve or that they desire. Clearly this requires interaction with the surrounding environment or social group and Murray stresses that:

"Psychology should not lose sight of human nature as it operates in everyday existence." (Murray, 1938:xii)

Murray divides needs into two broad categories; the primary (viscerogenic) needs and the secondary (psychogenic) needs. The *viscerogenic needs* are related to physical satisfactions and the *psychogenic needs* to mental or emotional satisfactions. Murray lists twelve viscerogenic needs; Air, Water, Food, Sex, Lactation, Urination, Defecation, Harmavoidance, Noxavoidance⁵, Heatavoidance, Coldavoidance and Sentience⁶. He also recognizes a need for Passivity, which includes relaxation, rest and sleep. (Murray, 1938)

The psychogenic needs stand for 'common reaction systems and wishes' according to Murray, who supposes that they are not fundamental, biological drives, but that some of them may be innate. Murray (1938) provides a full detailed account and explanation of his proposed psychogenic needs, but for the sake of this thesis a summary list, although lengthy, follows for reference;

Acquisition (Acquisitive attitude), *Conservance* (Conserving attitude), *Order* (Orderly attitude), *Retention* (Retentive attitude), *Construction* (Constructive attitude), *Superiority* (Ambitious attitude), *Achievement* (Achievant attitude), *Recognition* (Self-forwarding attitude), *Exhibition* (Exhibitionistic attitude), *Inviolacy* (Inviolable attitude), *Seclusion* (Isolatory or reticent attitude), *Infavoidance* (Infavoidant attitude)⁷, *Defendance* (Defensive attitude), *Counteraction* (Counteractive attitude), *Dominance* (Dominative attitude), *Deference* (Deferent attitude), *Similance* (Suggestible attitude)⁸, *Autonomy* (Autonomous attitude), *Contrariance* (Contrariant attitude)⁹, *Aggression* (Aggressive attitude), *Abasement* (Abasive attitude), *Blameavoidance* (Blamavoidance attitude)¹⁰, *Affiliation* (Affiliative attitude), *Rejection* (Rejective attitude), *Nurturance* (Nurturant attitude) and *Succorance* (Succorant attitude)¹¹.

Murray then admits that with some hesitation, *Play* (Playful attitude) is added, defining it as; 'To relax, amuse oneself, seek diversion and entertainment. To 'have fun', to play games. To laugh, joke and be merry. To avoid serious tension'. Finally, Murray identifies two complementary needs which he claims

occur frequently in social life; *Cognizance* (Inquiring attitude)¹² and *Exposition* (Expositive attitude)¹³. (Murray, 1938)

Murray also reports that evidence of rhythms of activity is found within both the viscerogenic and psychogenic need categories. He terms this the *periodicity of needs*.

"The fact of periodicity speaks for the dynamic importance of intraorganic successions. It also speaks for a theory of dynamic forces rather than theories which attempt to explain behaviour on the basis of chained reflexes." (Murray, 1938:85)

Murray also discusses *manifest* and *latent needs* in the context of need expression. He classifies the 'chief courses or levels' of need expression as;

1. *An objectified (overt or manifest) need*. This includes all action that is 'real' (seriously and responsibly directed towards actual objects), whether or not it is preceded by a conscious intention or wish.
2. *A semi-objectified need*. Here we class overt activity that is playfully and imaginatively (irresponsibly) directed towards real objects, or that is seriously directed towards imagined objects.
 - 2a Play, particularly the play of children, but also many of the things that adults do 'for fun', let us say, when they are intoxicated.
 - 2b Dramatics: expressing a need integrate by playing the preferred role in a theatrical production.
 - 2c Ritual, religious or semi-religious practices that are expressive of some relatedness to imagined higher powers.
 - 2d Artistic expression: singing a song, playing a musical composition or reciting a poem that gives expression to a complex.
 - 2e Artistic creation: composing a work of art (painting, sculpture, music, literature) that portrays a complex, in whole or in part.
3. *A subjectified need*. This covers all need activity that finds no overt expression. The following are significant:

- 3a Desires, temptations, plans fantasies, and dreams. Information as to these important processes must be obtained directly from the subject.
- 3b Vicarious living. Here, the subject occupies himself with the objectification by *another object* of tendencies similar to his own inhibited impulses. He empathically participates in the action. The following are sources of stimulation:
- i. Contemporary events, actual happenings in the present world which the subject observes (ex; an execution, a marriage or a funeral), or hears about from his acquaintances or reads about in the newspaper;
 - ii. Fiction, fairy tales, stories, plays and movies that the subject especially enjoys; or
 - iii. Art objects which represent some element in a need integrate. The art object may stand for an object of desire or of fear, or it may be something with which the individual can identify himself.
- (Murray, 1938:111-112)

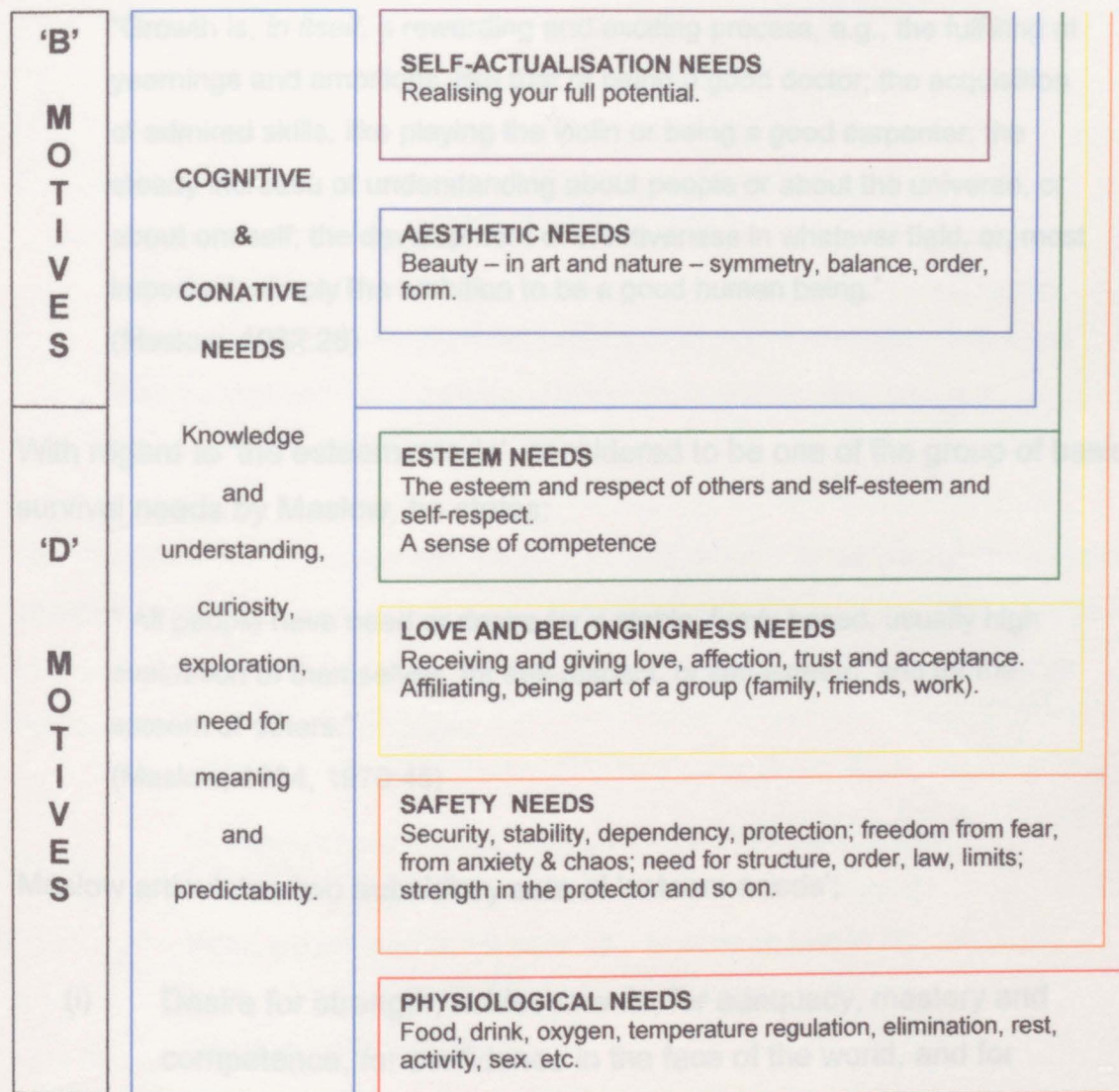
Murray also distinguishes that some needs are conscious, while others are unconscious. Whatever a subject can report or recall is considered conscious and everything else is considered unconscious.

Additionally, Murray discusses the concept of *Pre-actions and Outcomes*. Any action, which determines the course of future behaviour, is termed a 'pre-action'. Outcomes are considered to be 'the fortunes of previous strivings'. Further, Murray introduces the *Concept of Thema*;

"A simple thema is the combination of a particular press or pre-action or outcome and a particular need. It deals with the general nature of the environment and the general nature of the subject's reaction....In our experience, the unconscious (alter ego) of a person may be formulated best as an assemblage or federation of thematic tendencies."

(Murray, 1938:123)

Maslow (1954) formulates a 'positive theory of motivation' which is derived from clinical observation. He proposes that the theory is a fusion of functionalist, holistic and dynamic theoretical traditions and that this 'synthesis' produces a *holistic-dynamic* theory. Maslow's view was that humans are subject to *two* potential motivational states or forces. Firstly, those that ensure survival by satisfying basic physical and psychological needs (physiological, safety, belongingness, love and esteem needs); and secondly, those that promote a person's *self-actualisation*; that is the realisation of their full potential.



**Figure 2.1.1.1 Diagram to summarise
Maslow's 'Positive Theory of Motivation'.
(Based on Maslow, 1954, 1970:35-51)**

Maslow, one of the humanistic psychologists, claimed that while behaviours that relate to basic survival or deficiency needs (deficiency or D-motives or D-cognition) are carried out because they satisfy those needs, those that relate to self-actualisation are carried out for their own sake, because they are intrinsically satisfying (being or B-motives or B-cognition). Maslow reports that B-cognition is particularly executed in relation to intellectual and creative activities and that it is much more passive and receptive than active. He suggests that we could name it "*desireless awareness*". (Maslow, 1962:81)

"Growth is, *in itself*, a rewarding and exciting process, e.g., the fulfilling of yearnings and ambitions, like that of being a good doctor; the acquisition of admired skills, like playing the violin or being a good carpenter; the steady increase of understanding about people or about the universe, or about oneself; the development of creativeness in whatever field, or, most important, simply the ambition to be a good human being." (Maslow, 1962:28)

With regard to 'the esteem needs', considered to be one of the group of basic survival needs by Maslow, he states;

"All people have need or desire for a stable, firmly based, usually high evaluation of themselves, for self-respect, or self-esteem, and for the esteem of others."

(Maslow, 1954, 1970:45)

Maslow articulates two subsidiary sets of 'esteem needs';

- (i) Desire for strength, achievements, for adequacy, mastery and competence, for confidence in the face of the world, and for independence and freedom.
- (ii) Desire for reputation or prestige (defining it as respect or esteem from other people), status, fame and glory, dominance, recognition, attention, importance, dignity or appreciation.

Maslow asserts that the esteem needs have been stressed by Adler and his followers, but relatively neglected by Freud. He admits agreement with many existentialist views and philosophies. He also explains that the cognitive needs, for example understanding and knowledge, are essential pre-conditions throughout all of the needs. (Maslow, 1954, 1970)

Maslow also clarifies that;

"If we define growth as the various processes which bring the person toward ultimate self-actualization, then this conforms better with the observed fact that this is going on *all* the time in the life history. It discourages also the stepwise, all or none, saltatory conception of motivational progression towards self-actualization in which the basic needs are completely gratified, one by one, before the next higher one emerges into consciousness...we are thereby helped also to realize that basic needs and self-actualization do not contradict each other any more than do childhood and maturity. One passes into the other and is a necessary prerequisite for it." (Maslow, 1962:24)

Human goals are often remote, long-term and require achievement in a series of small steps. Human behaviour is unique in its ability to pursue goals that lie in the future and individually, people are differently able in the setting and achievement of long-term goals.

"A musician must make music, an artist must paint, a poet must write, if he is to be ultimately at peace with himself. What a man *can* be, he *must* be. He must be true to his own nature. This need we may call self-actualization."

(Maslow, 1954, 1970:46)

It is interesting that Maslow refers to these goals as *needs* rather than *desires*, giving the condition 'if he is to be ultimately at peace with himself'.

Maslow's theory provides an ideographic view of human psychology and strongly retains the importance of the personal experience of being human in addition to proposing a pro-active and optimistic view of human development.

"Difficult though it may be, we must learn to think holistically rather than atomistically. All these "opposites" are in fact hierarchically-integrated, especially in healthier people." (Maslow, 1962:164)

Maslow interviewed people who he considered to be self-actualizing and concluded with the view that at moments of *peak experience*¹⁴ (moments of happiness when people feel most 'real' and alive), the person is only concerned with 'being' and is totally unaware of any deficiencies in their needs or in the possible reactions of others to what they are doing. (Maslow, 1962)

"The multitude of idiosyncratic motives which come under the head of 'self-actualization' can hardly be listed since each person has different talents, capacities, potentialities. But some characteristics are general to all of them. And one is that these impulses are desired and welcomed, are enjoyable and pleasant, that the person wants more of them rather than less, and that if they constitute tensions, they are *pleasurable* tensions. The creator ordinarily welcomes his creative impulses, the talented person enjoys using and expanding his talents. It is simply inaccurate to speak in such instances of tension-reduction, implying thereby the getting rid of an annoying state. For these states are not annoying." (Maslow, 1962:27)

Furthermore, Maslow argues that

"The coming-to-rest theory isn't adequate even for deficiency motivation."
(Maslow, 1962:28)

Maslow felt that there had been an emphasis in psychology to identify neuroses or sickness and felt strongly that it is also important to illustrate, through the example of healthy people, the potential growth available to all human beings.

"We can never really understand human weakness without also understanding its healthy trends. Otherwise we make the mistake of pathologizing everything. But also we can never fully understand or help human strength without also understanding its weaknesses. Otherwise we fall into the errors of overoptimistic reliance on rationality alone. If we wish to help humans to become more fully human, we must realize not only that they try to realize themselves but that they are also reluctant or afraid or unable to do so. Only by fully appreciating this dialectic between sickness and health can we help to tip the balance in favour of health."

(Maslow, 1962:156)

In his positive approach to psychology, Maslow presents one of the problems generated by this perspective;

"Social psychology must shake itself free of that variety of cultural relativism, which stresses too much man's passivity, plasticity, and shapelessness and too little his autonomy, his growth tendencies, and the maturation of inner forces. It should study the active agent as well as the pawn." (Maslow, 1954, 1970:291)

Kelly's Personal Construct Theory (PCT) arose out of his belief in *man the scientist*; that all humans put their own interpretations or theories on the world of events and from these personal theories produce hypotheses, which are predictions about future events. Depending on the outcome, these hypotheses are either validated, or not, and this will determine the nature of subsequent behaviour. Kelly's approach is based upon his assumption that;

"...all of our present interpretations of the universe are subject to revision or replacement....we call this philosophical position *constructive alternativism*." (Kelly, 1955, 1963:15)

There is no way of checking whether one's interpretation of the world matches the reality, so each person sees the world through 'constructs' which are not

fixed, since the 'person as scientist' is constantly engaged in testing, checking and revising their own set of unique constructs which represent their working hypotheses. Each person's construct system is organised hierarchically, with broad constructs (superordinate) subsuming other, narrow constructs (subordinate). Kelly's theory comprises a *fundamental postulate*, which is;

"A person's processes are psychologically channelized by the ways in which he anticipates events." (Kelly, 1955, 1963:46)

Kelly declared that the concept of *motivation* and 'drives' or needs' could be dispensed with since he claims that we should reconsider motivation in a long-term view; where each individual is

"...ever seeking to predict and control the course of events with which he is involved." (Kelly, 1955, 1963:5)

Peck and Whitlow argue that Kelly trivialises important aspects of behaviour such as motivation, learning and emotion as well as neglecting situational influences on behaviour.

"In PCT we find little mention of motivation (or learning or perception or emotion); the person is considered to be essentially active. He is at all times trying to enhance his understanding of events and he does not need to be pulled or prodded into motion." (Peck & Whitlow, 1975:47)

Peck and Whitlow argue that in failing to deal adequately with emotion, Kelly's theory ignores 'a wealth of physiological knowledge' and that some of the definitions appear to "fly in the face of common-sense". (Peck & Whitlow, 1975:49)

"Situational factors are also neglected and PCT appears to place man in an 'empty world'." (Peck & Whitlow, 1975:54)

According to White (1959), the 'master reinforcer' which keeps most humans motivated over long periods of time, is the *competence motive*. Although not unique to the human race, competence is defined as;

"an organism's capacity to interact effectively with its environment."

(White, 1959:297)

In an article published in 1959, White attempts to 'describe more fully the possible nature of the motivational aspect of competence' by proposing that it be termed '*effectance*'.

"We might say that the effectance urge represents what the neuromuscular system wants to do when it is otherwise unoccupied or is gently stimulated by the environment." (White, 1959:321)

It is both rewarding and satisfying to feel that we are capable human beings and although hunger as a need comes and goes, competence remains a continuous motivator. Competence cannot be satisfied because it is not derived from a physiological need, it is not a motivator that pushes us to seek its reduction, as hunger would push us to find food.

A further important difference between competence motives and homeostatic drives (that is the satisfaction of physiological needs or imbalance), is that competence motives often involve a *search for stimulation* rather than an attempt to reduce it, as with homeostatic drives. The search for stimulation has been observed in other species and exhibits itself in similar behaviours, namely curiosity and exploration. These behaviours are continued even in the absence of any obvious extrinsic rewards such as food. Butler (1954) identified this as the *curiosity drive*. In his experiments with monkeys, to investigate their visual exploratory behaviour, data strongly suggested that the drive to explore visually was a fundamental motive in monkeys. Butler suggests that;

"The curiosity motives are largely responsible for the early and extensive learning which unquestionably contributes to the biological success of the primates." (Butler, 1954:75)

White (1959) describes how the behaviour of playful exploration with the environment surrounding us involves continual adaptation. Our environment is often dynamic, creating new situations and experiences for us to cope with. Satisfaction is not achieved through a 'consummatory climax', or a goal that is reached, but in a trend of behaviour. White therefore replaces the term 'satisfaction' with the term 'feeling of efficacy' in describing the subjective and affective aspects attached to *effectance motivation*.

Csikszentmihalyi (1975), when researching the experiences of sports players, rock-climbers, chess players, composers, dancers, artists and others that were felt to be involved with 'autotelic' activities, discovered that these people;

"...reported an exhilarating feeling of power while involved in the activity; at the same time, they spoke of the soothing sense of being part of something larger than themselves." (Csikszentmihalyi, 1975:195)

Csikszentmihalyi called this experience 'flow' and believed it was the reward, the basis for people's intrinsic motivation. He theorized that 'flow' is brought about by a balance between challenges and skills:

"Flow is experienced when people perceive opportunities for action as being evenly matched by their capabilities. If, however, skills are greater than the opportunities for using them, boredom will flow. And finally, a person with great skills and few opportunities for applying them will pass from the state of boredom again into that of anxiety. It follows that a flow activity is one which provides optimal challenges in relation to the actor's skills." (Csikszentmihalyi, 1975:50)

Some of Csikszentmihalyi's studies have shown that, during periods of 'flow', participants reported higher levels of concentration, creativity, control and activation. The studies also demonstrated differences in the amount of flow in different activities. (Csikszentmihalyi, 1975)

Carli, Delle Fave and Massimi (1988) found during studies with American and Italian teenagers, that satisfaction and happiness were reported for 'control' activities, that is where skills are rated as greater than challenges. According to flow theory, this situation should produce boredom. However, it can be observed that a lot of people do choose less demanding activities, such as watching television, much of the time, when given the opportunity to do whatever they like. (Argyle, 1996)

Csikszentmihalyi believed that *intrinsic motivation* was a source of flow. He defined *intrinsic motivation* as the reported wish to be doing the current activity and not something different. The artists, rock-climbers and others who had been studied by Csikszentmihalyi, were participating in activities where skills are needed to cope with challenges. Although this does produce intense, positive feelings, it does not motivate every person, in the same way as challenging work only motivates certain workers. It was found by Csikszentmihalyi that the amount of time spent in reported flow activity, varied greatly between individuals. (Csikszentmihalyi, 1975)

An interesting finding by Deci & Ryan (1987) while carrying out research into intrinsic motivation is that external rewards can often weaken the motivation to do something which is enjoyed for its own sake, because this changes the perceived locus of causation.

"When behavior is controlled by events such as rewards, the behavior tends to persist only so long as the controlling events are present. In terms of effective behavior change in therapeutic settings, the implication is that behavior change brought about through salient external controls is

less likely to persist following the termination of treatment than is change that is brought about more autonomously. Behavior and personality change will be maintained and transferred, we have argued, when the change is experienced as autonomous or self-determined."

(Deci & Ryan, 1987:1028)

Some people are able to find challenges and acquire or utilise the skills to deal with them more often than others, thus avoiding both boredom and anxiety better than others. Csikszentmihalyi called these '*autotelic*' personalities. It is clear, therefore that different individuals can tolerate different levels of arousal. (Csikszentmihalyi, 1975)

Apter (1982) proposed an interesting theory to account for this phenomenon. He suggests that there is not one homeostatic equilibrium condition, but two. These correspond to high and low states of arousal and to different motivations. Apter identified that when people are in a 'telic' state, they tend to pursue serious goals, frequently planning ahead and avoiding high arousal. The end product of this state is attainment of the goal and a state of relaxation. However, when people are in a 'paratelic' state, they are more likely to pursue goals that are playful, spontaneous and that add to their immediate pleasure. This is when they do things for their own sake, because they are fun or enjoyable. Apter claims that this state corresponds to intrinsic motivation. (Apter, 1982) Also, it should be noted that the subjective experience of high and low arousal is quite different in the two states. High arousal is experienced as stress when in a telic state but as excitement when in a paratelic state. Low arousal is experienced as relaxation when in the telic state, but boredom when in the paratelic state. Additionally, there are often reversals, where people shift from one state to another, which may be influenced by environment factors, frustration or through satiation of the original state. For example, someone might become bored with watching television and decide to go and do some gardening, or stop working to relax and listen to the radio. When in the paratelic

mode, more things are found humorous and most leisure would presumably be associated with this state.

Survival or physiological motives are essential not only to humans, but to all living creatures. Without basic biological survival, the human race would have disappeared. However, as identified by White (1959), competence remains a continuous motivator. A major competence motive is the need to be in control of our own destiny and not at the mercy of external forces. This need for control is closely linked with the need to be free from the controls and restrictions of others, in order that we may determine our own actions. Brehm (1966) reported that when our freedom is threatened, humans tend to react by reasserting their freedom. He called this *psychological reactance*.

Deci and Ryan's cognitive evaluation theory (Deci & Ryan, 1985b), focuses on the impact of contextual variables on motivation. Their model has been successfully used to predict and explain how events associated with the performance of a particular activity affect motivation to pursue the same activity again. Deci and Ryan agree that intrinsic motivation stems from drive-like human needs to be *self-determining* and competent, that is, to be *autonomous* rather than externally *controlled*. An intrinsically motivated behaviour is one which appears to be spontaneously initiated by the person in pursuit of nothing other than the activity itself. Accordingly, Deci and Ryan propose that events that foster self-determination or competence will enhance or maintain intrinsic motivation, whereas events that weaken self-determination or competence will decrease intrinsic motivation. Self-determination and competence from a specific experience should, in turn, contribute to the person's general self-perception of autonomy and if specific experiences do contribute to changes in general levels of self-determination and competency, then it follows that general changes in intrinsic motivation should also occur. These changes should be manifested behaviourally when the person encounters a new activity, thus affecting intrinsic motivation to engage in new activities. (Deci & Ryan, 1987)

Cognition means knowing, so cognitive motives are those driven by the acquisition of knowledge. Cognitive processes are all the ways in which knowledge is attained, retained and used, including attention, memory, perception, language, thinking, problem-solving, reasoning and concept-formation ('higher-order' mental activities). One of the most researched cognitive motives is the need for *cognitive consistency*. (Gross, 1992)

Cognitive psychology compares the human mind to a computer. It regards the mind as an *information processor* that selects information, codes it, stores it and retrieves it when needed. Memory, perception and language are central to this process. Learning and social psychology are cognitive, since they are concerned with the mental processes involved in interpersonal perception, learning and attitude change (*social cognition*). It could be claimed that all psychology is *social*, since all behaviour takes place within a social context. Even when alone, people are still influenced by what other people think or feel. Social motives are driven by social or environmental influences and are illustrated in behavioural or emotional responses to familiar situations or places.

Motivation is a central topic in the psychology of leisure and play. What motivates people in their interests and what are the rewards? Is it due to achievement, social motivation, self-image, self-expression, sex or perhaps aggression? Some leisure or play interests seem to be driven by a quest for excitement, but some are driven by a quest for rest and relaxation.

2.1.2 Play

There is more play at higher levels of the animal kingdom, which suggests that it may give some evolutionary advantage. It is widely assumed that play gives practice in motor skills; including the use of tools for primates and that it can establish social bonds and give practice in social skills. The drives of curiosity, exploration and manipulation are demonstrated in most forms of play. The Dutch anthropologist Johan Huizinga (1944, 1955) believed that play was the origin of culture. He believed that play consisted of contests with rules, or

representations, for fun, and that it is set apart from ordinary life. He identified that although play is not usually serious, it can become so, and that it can lead to the creation of new social institutions. Examples given are of inventions being produced when the inventor is fooling about, the practice of law in Greece being traced to a kind of ritualized contest and war being perceived as a game on a giant scale. Huizinga believed that much of life in the Middle Ages had a strong play element, with its elaborate dressing up and symbolism. He was concerned that life in the twentieth century had lost much of this play element.

As a child, play activity is needed for the child to learn to know their own world, to discover and learn about the objects which are presented to them by their senses. (Tudor Hart, 1955) For a child, play is a means of learning, training and practicing newly found skills. These skills, for example, grasping, holding, throwing, walking and climbing, co-ordination of hand, eye and brain, building, stimulating imagination, help to satisfy many emotional needs and feelings. It is through play that a child's physical, mental, emotional and social life grows and develops. Tudor Hart (1955) maintains that adults can help or impede this progress by the way in which they treat the child with regard to their play, and by the kind of play material that is provided. This potential impedance should also be considered in relation to leisure products in today's society since according to Tudor Hart, it is through play that a person gains confidence, self-reliance, initiative and independence. Above all, it is through play that children make their most important social contacts, that of their peers.

"It is through and in play that the young child first learns to curb his will voluntarily, in the interest of another, to accept orders from others, to conform to group decisions, to give and take services and to share. He learns to do all these things of his own free will because in that way lies the possibility of being a recognized and well-like member of the community. We would do well to consider what discipline and self-discipline are required to reach the stage of co-operative play of four-year-olds playing an elaborate game of mother and father, hospital and doctor, captain and crew of ship or an aeroplane." (Tudor Hart, 1955:10-11)

Freud's theory of play illustrates how he perceived some of the typical play behaviours used by a child to make sense of the world. Like *all* behaviour, Freud maintains that play is motivated behaviour (i.e. caused by the child's feelings and emotions, both unconscious and conscious). In common with dreams and fantasy, play is determined by *wishes*. (Freud, 1906-08, 1959) The child *can* distinguish play from reality but uses objects and situations from the real world to create a world of its own in which to *repeat* pleasant experiences at will and to order and alter events in the way that it finds most pleasing. For instance, when children want to be grown up and do what adults do, they can, in play where anything is possible.

The frequency with which *unpleasant* experiences are repeated in play interested Freud. For example when children who hate taking medicine dose their dolls with it, or they graphically re-enact a frightening accident or event. Through play Freud believed that the child was attempting to *master* disturbing experiences by *actively* bringing them about rather than being a passive and helpless victim; this view contributed to the development of *play therapy* and the use of *projective* tests of personality.

Freud, influenced by Fechner's principle of homeostasis¹⁵, concluded that humans try to keep excitation to a minimum since all increases in excitation are felt as unpleasant and all decreases as pleasurable. Repeating distressing or upsetting experiences in play is, in fact, an attempt to feel pleasure, since repetition *reduces* the associated excitation. The aim (as with all instincts in Freud's view) is to reduce tension or excitation to a minimum and ultimately, to its total elimination. He also concluded that this impulse to repeat (*repetition compulsion*) is part of the urge to return to an earlier, more stable, tension-free state (i.e. death). This was the idyllic state we enjoyed in the womb, where our needs were met as they arose and Freud proposes that the only way of achieving such a 'Nirvana' again is through death. (Freud, 1955)

Given that conflict and frustration are inevitable in life, Freud believed that much play can be seen as the special use of defence mechanisms that manifest themselves in projection, displacement, regression and sublimation. Freud also maintained that different kinds of play can be associated with different psychosexual stages, for example, playing roles that reflect identification with the same-sex parents during the phallic stage. (Freud, 1955)

Erikson (1950,1963), in his observations of play behaviour, relates play as an attempt by the individual to resolve any psychosocial crisis that is currently being experienced. Erikson indicates that play is not limited to childhood, but is pursued throughout the life cycle. According to Erikson, play also has a crucial social quality or dimension. The first 'social modalities' are learned during early development between a baby and mother. The initial interactions in this and other early relationships can help us learn how to resolve our psychosocial crises since we can try out possible solutions on others to see how they respond.

"As the child's radius of awareness, co-ordination, and responsiveness expands, he meets the educative patterns of his culture, and thus learns the basic modalities of human existence, each in personally and culturally significant ways." (Erikson, 1950,1963:75)

Gross (1992) makes an interesting comparison between Erikson's and Freud's stages of development. This is illustrated in table 2.1.2.1 and is included since it identifies the theoretical proposals of focus for each stage of human psychosocial development. It also demonstrates the potential focus for play activity at much later stages of life than would normally be identified.

No. of stage	Name of Stage (Psycho-social crises)	Psycho Social-modalities (dominant modes of being and acting)	Radius of significant relationships	Human virtues ('Qualities of strength')	Freud's Psycho-Sexual Stages	Approx. ages
1	Basic trust versus basic mistrust	To get, To give in return	Mother or mother-figure	Hope	Oral – Respiratory Sensory Kinesthetic	0-1
2	Autonomy versus Shame and doubt	To hold on, To let go	Parents	Willpower	Anal-Urethral Muscular	1-3
3	Initiative versus Guilt	To make (going after), To 'make like' (playing)	Basic family	Purpose	Phallic Locomotor	3-6
4	Industry versus Inferiority	To make things (completing), To make things together	Neighbourhood and School	Competence	Latency	7-12
5	Identity versus Role confusion	To be oneself (or not to be), To share being oneself	Peer groups and outgroups, models of leadership	Fidelity	Genital	12-18
6	Intimacy versus Isolation	To lose and find oneself in another	Partners in friendship, sex, competition, co-operation	Love		20s
7	Generativity versus Stagnation	To make be, To take care of	Divided labour and Shared household	Care		Late 20s-50s
8	Ego integrity versus Despair	To be, through having been, To face not being	'Humankind', 'my kind'	Wisdom		50s and beyond

Table 2.1.2.1. Comparison between Erikson's and Freud's stages of development. (from Gross, 1992)

According to Erikson, play deals with life experiences and attempts to repeat, master or negate these in order to organise an inner world in relation to the outer one. It also involves self-teaching and self-healing. (Erikson, 1950,1963)

'Playing it out' becomes the child's means of reasoning and allows the child to free itself from the ego boundaries of time, space and reality but maintain a reality orientation because it and others know it is 'just play'. Erikson illustrates that play is also an important form of self-expression for the ego and helps the child (and presumably also the adult) master new developmental stages.

"Industrial revolution, world-wide communication, standardization, centralization, and mechanization threaten the identities which man has inherited from primitive, agrarian, feudal, and patrician cultures. What inner equilibrium these cultures had to offer is now endangered on a gigantic scale. As the fear of loss of identity dominates much of our irrational motivation, it calls upon the whole arsenal of anxiety which is left in each individual from the mere fact of his childhood. In this emergency masses of people become ready to seek salvation in pseudo identities." (Erikson, 1950, 1963:412)

This observation is interesting considering cultural history since the 1960's when this work was published. 'Pseudo identities' could of course be interpreted and manifested in a number of ways and there is no doubt in my mind that this has happened on a large scale. Additionally though there is little doubt that in today's cultural climate, the identity of individuality is difficult to obtain as we are all increasingly given *numbers* in order to identify ourselves for various organizations and systems of social control or welfare, or encouraged to be led by invasive marketing to participate in particular lifestyles or brands.

Before Jean Piaget's theory of play can be reviewed, it is necessary to understand that his work focused on the study of how knowledge develops in human beings. To Piaget, intelligence is the whole system of cognitive adaptations in humans; intelligence consists of knowledge and the cognitive functions integral to the form of knowledge representation. Piaget regarded

intelligence as a *process*, something which changes over time and which represents a means by which humans *adapt* to their environment. The process essentially involves the individual trying to *construct* an understanding of reality by *interacting* with it. Piaget believed that knowledge has to be discovered actively.

"Knowledge, then, at its origin, neither arises from objects nor from the subject, but from interactions – at first inextricable – between the subject and those objects." (Piaget, 1970:703)

Piaget proposed that these structures develop in a predictable way and can be summarised as four major stages of cognitive development, through which all children progress; the *sensory-motor* stage (0–2 years); the *pre-operational* stage (2–7 years); the *concrete operational* stage (7–11 years); the *formal operational* stage (11–15 years). People move through these stages of intelligence development at different speeds, usually due to environmental factors. However, the sequence of stages is universal, being based on biological maturation. Piaget maintained that development is a continuous process, rather like a spiral, with later stages building on earlier ones by *reconstructing* new levels of achievement built onto the earlier stages. (Piaget, 1950)

During this progression, *schemas* (or schemes) are identified as being the basic unit of intelligent behaviour. A baby's schemas are mainly concerned with inborn reflexes, for example sucking, and tend to operate quite independently of other reflexes. In the course of development, separate schemas co-ordinate and integrate into a more inclusive structure. It is these 'structures' which constitute the typical abilities and understanding of each development stage.

"..schemas of action, i.e. co-ordinated systems of movements and perceptions, which constitute any elementary behaviour capable of being repeated and applied to new situations." (Piaget, 1951:274)

The schemas change by means of *assimilation*, *accommodation* and *equilibrium*. In *assimilation* the schemas that the youngster already possesses are utilised to try to fit into the environment and can be thought of as the use of skills we already possess. Schemas are not just physical actions or skills but include, for example, ideas, concepts, bits of knowledge and verbal labels. In *accommodation* already existing schemas are changed to match any new requirements of the environment, which brings the child to *equilibrium*. For example the sucking reflex will develop into drinking from a cup if a child is continually offered a cup to drink with. It may take much practice before the new technique of drinking is mastered, but nevertheless it will be acquired and it is at this point that accommodation occurs. When a schema has just been developed, assimilation again then ensures that the new learning is consolidated by being practiced repeatedly until it becomes easy and automatic. Piaget proposed that it is through this continual series of assimilations and accommodations, equilibrium and disequilibrium, that development proceeds as an ongoing process throughout life, but with the most significant developments taking place during the first fifteen years or so of life. Assimilation and accommodation together constitute the fundamental process of *adaption*, which Piaget believed was central to human life. (Piaget 1970)

Piaget (1951) saw play as an *adaptive* activity, which begins early in the sensory-motor period (0-2 years) when infants start to repeat actions which they find satisfying or pleasurable. He called these repetitions of actions 'circular reactions' and distinguished three major kinds corresponding to three sub-stages of the sensorimotor period:

- (i) *primary circular reactions* (1-4 months) centered on the baby's own body;
- (ii) *secondary circular reactions* (4-8 months) centered on external objects.
- (iii) *tertiary circular reactions* (12-18 months) where the child experiments in order to find new ways to solve problems or to reproduce interesting outcomes. (Piaget, 1951)

According to Piaget, play, as an adaptive activity, involves both assimilation and accommodation. However, assimilation is often the more important and evident of the two processes and a great deal of play (especially up to the end of the pre-operational period, 2-7 years) is 'pure assimilation', whereby the child attempts to fit the world of reality into its own needs and experience. By contrast, imitation is an action of almost 'pure' accommodation. Following on from this, Piaget makes a distinction between play which is performed for its own sake, and intellectual activity or learning in which there is an external aim or purpose. In play, Piaget maintains that the child repeats behavior not in any effort to learn or investigate but for the mere joy of mastering the action and of showing off to himself his own power of controlling reality, therefore play is done for its own sake. Piaget also believed that play allows children to practise their competencies in a relaxed and carefree way. (Piaget, 1951)

Piaget applies this distinction between play and intellectual activity to three major kinds of play that he classifies; *Practice play*, *Symbolic play* and *Play with Rules*. (Piaget, 1951) Throughout development, Piaget argues that play serves to consolidate recently acquired abilities and also aids the development of additional cognitive and social skills. Piaget proposed that the three major kinds of play correspond to the major stages of his cognitive development theory:

- | | |
|---|------------------------|
| I. First Period: (Sensory-motor stage) | Practice Play |
| Sensory-motor activity (age 0-2) | |
| II. Second Period: (Pre-operational stage) | Symbolic Play |
| Egocentric representative activity | |
| Stage I: Preconceptual thought (age 2-7) | |
| III. Second Period: (Pre-operational stage) | |
| Egocentric representative activity | |
| Stage II: Intuitive thought (age 4/5-7) | |
| IV. Third Period: Operational representative activity | Play with Rules |
| Concrete operational activity (age 7-11) | |
| Formal (including abstract) operational activity (after age 11) | |
| (Piaget, 1951) | |

Maslow (1954, 1970) claims that play 'may be either coping or expressive' and hopes that more 'useful and realistic interpretations of animal play' will arise from the realization that this 'coping-expressive dichotomy' exists. He suggests that in order to 'open up this new area for research', we need to admit that it is possible for play to be unmotivated; 'a phenomenon of being rather than of striving, end rather than means.' (Maslow, 1954, 1970:238)

It is interesting to compare these theories of more than fifty years ago with a more recent publication, Diane Ackerman's book, *Deep Play* (1999). In this Ackerman asks the question; "Why play at all?" The following quote from Ackerman goes a long way towards answering such a question:

"Every element of the human saga requires play. We evolved through play. Our culture thrives on play. Courtship includes high theater, rituals, and ceremonies of play. Ideas are playful reverberations of the mind. Language is a playing with words until they can impersonate physical objects and abstract ideas. Animal play serves many purposes. It can be a dress rehearsal for adult life, as when young mammals play courtship games, war games, socializing games, motor-skills games....Play is far older than humans. It's so familiar to us, so deeply ingrained in the matrix of our childhood, that we take it for granted. But consider this: ants don't play. They don't need to. Programmed for certain behaviors, they automatically perform them from birth. Learning through repetition, honed skills, and ingenuity isn't required in their heritage. The more an animal needs to learn in order to survive, the more it needs to play. The more leisure time it has, the more it can play.....Play is widespread among animals because it invites problem-solving, allowing a creature to test its limits and develop strategies. In a dangerous world, where dramas change daily, survival belongs to the agile not the idle. We may think of play as optional, a casual activity. But play is fundamental to evolution. Without play, humans and many other animals would perish." (Ackerman, 1999:3)

According to Ackerman, play is a refuge from ordinary life, a sanctuary of the mind, where one is exempt from life's customs, methods, and decrees. She argues that play always has a special place, some version of a playground, in which it happens and also that play has a time limit. Sometimes the time limit is prearranged; at other times it's only recognizable in retrospect.

Ackerman is influenced by Huizinga (1944, 1955) and quotes his identification of one of the 'very positive feature of play':

"It creates order, *is order*. Into an imperfect world and into the confusion of life it brings a temporary, a limited perfection. Play demands order absolute and supreme. The least deviation from it 'spoils the game', robs it of its character and makes it worthless."

(Huizinga, 1944, 1955:10)

Ackerman also believes that play has its own distinctive psychology. It happens outside ordinary life, and it requires freedom. Players like to invent worlds, alter the outcomes of events, supplement versions of reality, or create other selves. Make-believe is at the heart of play, and Ackerman argues that it is also at the heart of much of what passes for work. Much play also involves competition and tests skills or courage. "To play is to risk: to risk is to play." (Ackerman, 1999:7) Ackerman identifies that interestingly, the word fight derives from the word play. She also reports the context of medieval tournaments being ritualized battles that followed strict rules and contained many of the elements of play; a special location, particular costumes, time limits met, rules followed, rituals performed, where the atmosphere is tense and the outcome uncertain.

Ackerman also relates some uses of language describing play; in Anglo-Saxon times, the word for play was *plega*, which meant singing or dancing gestures, clapping and quick movements. In Indo-European culture, *plegan* meant to risk, chance or expose oneself to hazards. A pledge was integral to the act of play, as was danger. Play's original purpose was to make a pledge to someone or

something by risking one's life. However, by far the most common use of play words, in many languages, is in the erotic context. The Sanskrit word for copulation is *kridaratnam*, which translates as "the jewel of games." In Germany, a *Spielkind* (literally a "play child") is a baby born out of wedlock. In English, we make a play for, play up to, or 'indulge' in love play. The English word for lechery also evolved from *leik*, a root word for play. Among Native Americans of the Blackfoot tribe, the word *koani* could be applied either to child's play or to unlawful sex. Ackerman's research reveals that words for play mainly gave rise to words used in love play, battle, or religious rites and that feasts and festivals also trace their etymology to play. (Ackerman, 1999)

Ackerman proposes that:

"The savage is what we sometimes long to be, living by cunning and raw emotion, attuned to nature, senses alert, eluding danger, thrilled by challenge." (Ackerman, 1999:9)

Ackerman claims that there is a connection between moral power and the sense of exposure to the mortal elements and argues that as a human, facing trials and winning is essential, especially if the forces of good are against the forces of evil. She also states that luck is an important component; particular examples are the myths, where gods wager with human life and ancient heroes given sacred riddles to solve, where a wrong answer meant death. This is illustrated clearly in ancient and modern courtrooms, where opposite sides also battle with words. Ackerman (1999) agrees with Huizinga's argument that;

"The rules of warfare, the conventions of noble living, were built up on play-patterns. We have to conclude, therefore, that civilization is, in its earliest phases, played." (Huizinga, 1944, 1955:173)

Ackerman also challenges our 'normal' perception that play is self-indulgent and irresponsible. She argues that sports are the height of seriousness and cites the example of ancient Roman "games" which included bloodthirsty crowds and gruesome deaths; she identifies that the games could often be whimsical: 'let's

see what happens if we pit a man against a bear or a crocodile'. Also, Ackerman claims that children can be observed to be extremely serious about play, behaviour also observed by Tudor Hart, (1955) during the twenty-five years of her teaching experience. Because we think of play as the opposite of seriousness, we don't notice that it governs most of society.

In common with Huizinga, Ackerman proposes that play can be observed in political games, in law games, money games, love games, advertising games and many more areas of day to day life. Ackerman proposes that much of human life unfolds as play, that it offers rare challenges, has different strengths, and 'even in its least intoxicating forms', feels satisfying, absorbing, and has rules and a life of its own. Ackerman particularly explores transcendent play.

"Not just how children play - rejoicing in the delights of silliness, perfecting their coordination, or rehearsing the rules of courtship and society - but a special dimension of adult play. Something exquisitely human. Of course, adults often play in the same way and for the same reasons that children do; they act silly because it's fun; they play to socialize, and that can include besting a rival or developing a friendship. But there is a deeper form of play, akin to rapture and ecstasy, that humans relish, even require to feel whole." (Ackerman, 1999:12)

Ackerman proposes that *deep play* is the ecstatic form of play. Perhaps related to the 'flow' identified by Csikszentmihalyi (1975). She states that *deep play* should be classified by *mood*, not *activity*. Ackerman also clarifies that games don't guarantee deep play, but identifies some activities that are prone to it: art, religion, risk-taking, and some sports, especially those that take place in relatively remote, silent, and mesmeric environments, for example scuba diving, parachuting, hang gliding or mountaineering. Deep play appears therefore to involve an almost sacred and holy experience, sometimes hidden in the most unlikely or humble places. Ackerman argues that we spend much time in these pleasure-seeking activities in pursuit of moments that will allow these altered states to happen.

Ackerman also identifies that creativity, psychotherapy and sensation-seeking are all ideal playgrounds for deep play. She argues that psychotherapy can be experienced as *deep play* since all play happens in a special mental place similar to therapy, where there are time limits and rules, where one feels 'beyond everyday life'. She also argues that psychotherapy contains uncertainty, illusion, an element of make-believe or fantasy, and allows one to take risks, or explore new or past roles, thus illustrating other recognizable components of play.

"Psychotherapy takes place in the overlap of two areas of playing, that of the patient and that of the therapist. Psychotherapy has to do with two people playing together ... psychoanalysis has been developed as a highly specialized form of playing in the service of communication with oneself and others." (Ackerman, 1999:14)

Ackerman's text also reveals other writers who have illuminated important facets of the human condition that she relates to deep play: D. W. Winnicott wrote about play as a creative state of withdrawal from everyday life. Sartre, Heraclitus, Plato, and Nietzsche emphasised the appeal of control and freedom in play. She is clearly influenced by Johan Huizinga's work about play and society, identifying play as the beginnings of culture and Abraham H. Maslow, who Ackerman describes as writing of "peak experiences ... of ecstasy, rapture, bliss, the greatest joy," transcendent states that also include "awe, mystery, complete perfection, humility, surrender, and worship." She acknowledges that healthy ("self-actualizing") people often experience such inherently rewarding moments as they discover their capabilities and limits.

Ackerman argues that play is central to the life of each person and also to society. Her claim is that it inspires the visual, musical, and verbal arts; exploration and discovery; war; law; and other elements of culture. This is similar to Huizinga's view of play being the source of culture. Ackerman claims

additionally that *Deep Play* reveals a human need to seek a special kind of transcendence; that humans pursue this with a passion that makes thrill-seeking explicable, creativity possible, and religion inevitable. She also claims that although religion seems an unlikely example of 'playing', a close examination of religious rites and festivals reveals all of the play elements, and also how deep that play can become. Religious rituals usually include dance, worship, music, and decoration. They often take a long time, yet people are so absorbed that they hardly notice time passing. Interestingly, in the context of language and communication, Ackerman reveals that the word "prayer" derives from the Latin *precarius*, and contains the idea of uncertainty and risk implying that life or death may depend upon the outcome. (Ackerman, 1999)

Perhaps Ackerman's view of 'religion as play' is also derived from Huizinga's theories. The following quote from Huizinga, expresses his view:

"Let us consider for a moment the following argument. The child plays in complete – we can well say, in sacred – earnest. But it plays and knows that it plays. The sportsman, too, plays with all the fervour of a man enraptured, but he still knows that he is playing. The actor on the stage is wholly absorbed in his playing, but is all the time conscious of "the play." The same holds true of the violinist, though he may soar to realms beyond the world. The play-character, therefore may attach to the sublimest forms of action. Can we now extend the line to ritual and say that the priest performing the rites of sacrifice is only playing? At first sight it seems preposterous, for if you grant it for one religion you must grant it for all. Hence our ideas of ritual, magic, liturgy, sacrament, mystery would all fall within the play concept." (Huizinga, 1944,1955:18)

From a general perspective, the average person on the street would surely argue that play is simply about enjoyment. We do not consciously engage in play to find out how things work, to try out different roles or to exercise imagination. We play because it is fun and satisfying, any learning that results is incidental and subconscious. However, the next section attempts to cover

some of the theories specifically relating to learning and discuss them in the context of play.

2.1.3 Learning

Before any of the psychological theories of learning can be reviewed there are several general issues relating to this area of research that need to be understood;

Psychologists differ regarding the extent to which they focus on the overt, behavioural changes as opposed to the covert, cognitive changes involved in learning. Behaviourist approaches to psychology, for example Watson and Skinner, emphasis the overt behavioural changes to the exclusion of the cognitive, while cognitive psychologists are more interested in the cognitive changes as they are reflected in behaviour. (Gross, 1992)

It is also important to be clear that most psychology focuses on the process of learning rather than what is learned. Gross (1992) stresses that learning is a hypothetical construct. In other words, it cannot be directly observed but can only be inferred from observable behaviour. Learning normally corresponds with a permanent change in a person's behavioural performance for a particular task or situation. However, behavioural changes can occur due to other causes, for example the changes associated with puberty and other maturation processes, or more severe changes such as brain damage.

As with all of the psychological literature, there are many learning theories that this thesis does not have the capacity to cover. However, an attempt has been made to examine a range of theories considered relevant within the specified context of human computer interaction, across the last century. This is by no means an exhaustive review, but again shows the important potential of integrating knowledge from the different domains that contribute to the discipline

of human computer interaction, as illustrated in the introductory chapter of this thesis. In this way the body of knowledge that already exists in more mature disciplines, such as psychology, can be applied to contemporary design situations, informing and assisting the design process for developers of leisure software products and inclusive interactive digital media.

At the beginning of the twentieth century, Russian physiologist Ivan Pavlov was researching the process of digestion in dogs and the 'anticipatory' behaviour of dogs in relation to food. Pavlov developed a technique by which a dog's salivary secretions could be collected and measured since he noticed that the dogs would often salivate before any food was given to them. Pavlov then introduced a *conditioned stimulus* into the experiment by sounding a noise just before and during the presentation of food to the dogs. The 'sound-food' sequence was repeated over and over again and gradually the amount of saliva produced by the dog began to increase *as soon* as the sound was heard, since the dog was anticipating the arrival of the food. The animal could now be said to be salivating in response to the sound rather than to the food. Pavlov called the presentation of the food the *unconditioned stimulus* and the salivation which it evoked the *unconditioned response*. The repeated pairing of the sound with the food turned the originally 'neutral' stimulus into a *conditioned stimulus* which now evoked salivation as a *conditioned response*. The whole process was called conditioning, now commonly referred to as *Classical or Respondent conditioning*. (Pavlov, 1927)

The first attempt to apply Pavlov's findings with dogs to humans was made by Watson and Rayner (1920) who managed to induce fear in a young child through classical conditioning. This work led the way for Jones (1924b) to treat a young boy using '*direct unconditioning*', a method of removing fears (or phobias) called *systematic desensitization*. The boy learned not to be frightened of a range of things which he had previously had an extreme fear of.

Skinner (1938) claimed that most animal and human behaviour is not driven by specific stimuli in the way described by Pavlov and Watson, but that the interest lies in how animals *operate* on their environment and how this 'operant behaviour' is *instrumental* in bringing about certain *consequences* which then determine how probable that behaviour is to be repeated. Skinner saw a distinct difference between respondent and operant behaviour and saw the learner as much more *active* than Pavlov or Watson. In *operant conditioning* the outcome is much less certain. Behaviour is *emitted* by the organism rather than *elicited* by the stimulus. Thus the behaviour is essentially *voluntary*, as opposed to reflex or involuntary. The likelihood of a particular behaviour being emitted is directly related to the past consequences of that behaviour.

Skinner maintained that the consequences of operants can be; *positive reinforcement*; *negative reinforcement*; or *punishment*. Skinner (1953:73)

Positive and negative reinforcement have the same effect on behaviour, which is *strengthening* it and making it more probable. *Positive reinforcement* involves presenting something that an animal likes (for example, food). *Negative reinforcement* involves the removal or avoidance of some 'aversive' (usually painful) state (for example electric shock). *Punishment* weakens behaviour (making it less probable) by presenting an aversive stimulus. (Skinner, 1953)

Skinner's principles of positive and negative reinforcement have certain similarities with the pleasure seeking and avoidance of pain key to Hobbe's early theory.

Tolman (1948) illustrated, in his experiments with rats in a maze, that during non-rewarded trials the animals had been learning more than they had exhibited in their behavior.

" ..as long as the animals were not getting any food at the end of the maze they continued to take their time in going through it – they continued to enter many blinds. Once, however, they knew they were to get food, they demonstrated that during these preceding non-rewarded trials they had

learned where many of the blinds were. They had been building up a 'map', and could utilize the latter as soon as they were motivated to do so." (Tolman, 1948:195)

Tolman's experiments help to explain *latent learning*, but take this theory further by illustrating that the rats in a maze appear, during latent learning to establish 'something like a field map of the environment' in their brain. (Tolman, 1948:192) Tolman called these '*cognitive maps*' and proposed that they represented a primitive kind of perceptual map. A cognitive map cannot be directly observed but only inferred by behaviour, the behaviour of Tolman's rats, showed that they had an understanding of the spatial relationships that constituted the maze, so that when a reward was presented they adjusted their 'exploratory' behavior to quickly find the food and avoid the blind alleys. Tolman proposes:

"First, that learning consists not in stimulus-response connections but in the building up in the nervous system of sets which function like cognitive maps, and second, that such cognitive maps may be usefully characterized as varying from a narrow strip variety to a broader comprehensive variety." (Tolman, 1948:193)

However, further experiments by Tolman, illustrated that, in fact most rats did show that they had acquired a wider comprehensive map, since when the route to the reward was altered, they still exhibited behavior which led them in the correct direction to where the food was situated.

Tolman proposes that;

"..some, at least, of the so-called 'psychological mechanisms' which the clinical psychologist and the other students of personality have uncovered as the devils underlying many of our individual and social maladjustments can be interpreted as narrowings of our cognitive maps due to too strong motivations or to too intense frustration."

(Tolman, 1948:207)

In light of this, Tolman argues the importance of 'child-trainers' and 'world-planners' developing broad cognitive maps:

"Only then can these children learn to look before and after, learn to see that there are often round-about and safer paths to their quite proper goals." (Tolman, 1948:208)

According to Vygotsky (1934, 1962) thought and language start out as separate and independent activities. In very young humans, as in animals, thought precedes language and language is devoid of thought, for example when a baby cries or makes other sounds, it is usually expressing feelings, or trying to attract attention or fulfill some other social aim. Then, at about age two, Vygotsky argues that there is a crucial moment when pre-linguistic thought and pre-intellectual language meet and join to initiate a new kind of behavior where thought is turned into communication or words. In relation to *pointing*, Vygotsky states:

"We consider this transitional gesture a most important step from unadulterated affective expression toward objective language."

(Vygotsky, 1934, 1962:35)

Initially, pointing is nothing more than an unsuccessful attempt to grasp something beyond a baby's reach. However, when a mother sees a child trying to reach something, she usually comes to help and is likely to point to the object. The child learns to do the same. It is the social mediation, not the object itself, which provides the basis for the child learning to point and a communication or language can be built upon this social mediation. Vygotsky claims that this is the most significant moment in the course of intellectual development, since it gives birth to the purely human forms of practical and abstract intelligence which occur when speech and practical activity, two previously completely independent lines of development, converge. (Vygotsky, 1934, 1962)

Vygotsky theorises that between the ages of two and seven, language has two functions, firstly as an internal language that motivates and directs internal thought, and secondly as an external language that communicates the results of the child's thinking to others.

"Inner speech is speech for oneself; external speech is for others."

(Vygotsky, 1934,1962:131)

'Egocentric' speech, where a child talks out loud about their plans and actions is common and is the result of the child neither thinking privately nor communicating publicly to others, but being somewhere in between, unable to distinguish between speech for itself and speech for others.

"Direct communication between minds is impossible, not only physically but psychologically. Communications can be achieved only in a roundabout way. Thought must pass first through meanings and then through words." (Vygotsky, 1934,1962:150)

At about age seven, according to Vygotsky, around the time when concrete operational thought usually begins, the child learns how to restrict its overt language to the purposes of communication, at the same time as the thought function of language is being internalised as internal speech or verbal thought.

"All our observations indicate that inner speech is an autonomous speech function. We can confidently regard it as a distinct plane of verbal thought. It is evident that the transition from inner to external speech is not a simple translation from one language into another. It cannot be achieved by merely vocalizing silent speech. It is a complex, dynamic process involving the transformation of the predicative, idiomatic structure of inner speech into syntactically articulated speech intelligible to others. "
(Vygotsky, 1934,1962:148)

Vygotsky's experiments illustrated that when six or seven year olds are trying to solve difficult problems or become frustrated when attempting to do something, they often resort to overt verbalization or 'egocentric speech'. Adults too often 'think out loud' in similar situations. Vygotsky was convinced that these findings;

"..indicate that the function of egocentric speech is similar to that of inner speech; It does not merely accompany the child's activity; it serves mental orientation, conscious understanding; it helps in overcoming difficulties; it is speech for oneself, intimately and usefully connected with the child's thinking. Its fate is very different from that described by Piaget. Egocentric speech develops along a rising, not a declining, curve; it goes through an evolution, not an involution. In the end, it becomes inner speech."

(Vygotsky, 1934,1962:133)

Vygotsky reports that because of the decreasing vocalization of egocentric speech, the child develops a new skill of 'thinking words' instead of saying them, thus developing the ability to abstract and abbreviate thought and language.

Bruner (1966) developed a theory of modes of representation that presented three different forms that our knowledge and understanding can take. Bruner claims that language is essential if thought or knowledge are not to be limited to what can be learned through actions (enactive representation) or images (iconic representation). He argued that language was crucial for the development of a third mode, 'symbolic representation'. Bruner sees the 'symbolic mode' as the phase where language has most influence on thought. For Bruner, language and logical thinking are inseparable. Without language, Bruner argues that human thought would be limited to what could be learned through actions or images:

"Man is seen to grow by the process of internalizing the ways of acting, imaging, and symbolizing that "exist" in his culture, ways that amplify his powers....Whenever learning occurs outside the context it will be used, outside the ranges of events that are directly supportive in a perceptual way or indirectly available for pointing, then language enters as a means of conveying the content of experience and of action."

(Bruner, 1966:320-322)

The example of pointing supports Piaget's view of language and cognitive structures, by illustrating the convergence of previously independent developments. This supports Piaget's beliefs about knowledge as a set of structures that are progressively created by continuous interaction between a person and the world. (Piaget, 1970)

Piaget's views on how knowledge develops in humans have been covered in section 2.1.2 on play earlier in this chapter. An important distinction, made by Piaget, was that there was a difference between play for its own sake and intellectual activity or learning in which there is an external aim or purpose. He did however also admit that play not only served to consolidate recently acquired abilities, but also, importantly, that it assisted the development of additional cognitive and social skills, therefore implying that learning can take place during any kind of play. (Piaget, 1970)

Howe (1980) offers his own definition of learning:

"In brief, learning enables human beings to make adaptive modifications that allow the species to survive and prosper."

(Howe, 1980:3)

According to Howe, learning is cumulative. What we learn at any time is influenced by the things that we have previously learnt. This illustrates how closely developmental and learning processes are linked. Howe argues that most instances of learning take the form of adaptive changes where we increase our effectiveness in dealing with the environment. (Howe, 1980) This demonstrates an obvious survival value, but interestingly, it also links with White's (1959) *competence motive*, where 'competence' is also defined as 'our capacity to deal effectively with the environment'. (White, 1959:297)

Diana Oblinger¹⁶, who is familiar with the interaction between higher education and information technology (IT), from both a business and an educational angle, expresses a more recent view of learning. In an interview in 2002 for *The Technology Source*¹⁷, Oblinger comments on information technology and the future of education.

"Although we've come a long way in using IT tools to enhance education, at present we're hampered by our fragmented approach to incorporating them. In almost every institution you can find islands of innovation, but we have yet to integrate the pieces into a seamless enterprise."

(Oblinger, 2002:1)

Oblinger goes on to discuss how these institutions have welcomed IT tools that help them manage education and accountability to meet the demands placed upon them, however, she claims that the obstacle to a more seamless educational enterprise is the fragmentation of the institutional organisations themselves and the integration of new technology. She also identifies a number of significant forces currently driving the use of IT tools in education;

"There are a number of significant drivers. One is technology itself.

Technology challenges people's assumptions about what it means to be educated. Technology and globalization have changed the way we do business; as a result, we have seen the emergence of a lifelong learning

culture, one in which education allows us to keep pace with change. Moreover, it goes beyond extending our notion of education from four years to a lifetime. In fulfilling the expectation for lifelong learning that it created, technology changes both the ways in which we learn and the ways in which we conceive of the learning process. IT tools provide just-in-time learning, knowledge management, simulation, and visualization. Through the use of these tools, we have grown increasingly aware that learning facts is not enough. Knowledge management in particular is leading us to question our focus on explicit knowledge, gained from textbooks, and our relative neglect of tacit knowledge, gained from experience." (Oblinger, 2002:2)

Oblinger envisaged at this time that a great deal of effort would be put into integration and the creation of more seamless educational systems. She also draws attention to the changes in the wider range of students wanting to learn and the increasingly divergent student expectations, citing the example of younger students who have never known life without technology and older students who are new to technology or who have also become accustomed to the speed and response times associated with technology based services.

"Another area that IT tools will continue to influence involves learning. Already, our focus has shifted from teaching to learning, and our next step is to redefine the IT enriched learning environment. Much of what we have done in the past has been constrained by the prevailing conception of the classroom, but the lecture and the lab are only two ways to learn. Now we are getting into visualization, simulation and electronic performance support systems. The next step may be the integration of knowledge management and e-learning systems to augment current practices. This represents a more radical revision of the classroom, since knowledge currently being developed within an institution could serve as the material for its classes, which would break down barriers between research and learning." (Oblinger, 2002:3)

Oblinger argues that people learn best when they *need* information and that if information is delivered at the point of need so that it can be put to use

immediately, *learning* is more effective. Oblinger also claims that a growing enthusiasm for learning communities requires online learning communities that complement face-to-face environments. These environments, it is argued, will establish connections between individuals resulting in a learning experience built around sharing information, challenging ideas and constructing new paradigms. Oblinger also identifies *time* as being a key factor, recognising the tension between needing to change to accommodate technology and needing time to absorb change and prepare for change. Oblinger's summary view focuses on the importance of retaining the correct perspective relating to technological developments;

"Ultimately, the information revolution is not about technology; it is about what happens to people as a result. We have to remember that education is a very human endeavor and that students are terribly important people. Although technology plays a central role, people still come first."
(Oblinger, 2002:5)

During the period 2001 to 2002 in the United Kingdom, at the same time that Oblinger was forming these opinions in the United States, research was being carried out that resulted in two conferences investigating the future of education. The first conference was organised by the British Educational Communications and Technology Agency (BECTa)¹⁸ working in partnership with the National Grid for Learning (NGfL)¹⁹. The conference report²⁰, published in 2001, entitled; *Helping to Create Schools of the Future*, outlines the strategy for ICT in education at this time, and in summary proposes:

1. The creation of an infrastructure that allows the widening community to benefit from the NGfL.
2. Providing learners, teachers and institutions with access to educationally valuable content and services.
3. Developing a profession that makes effective personal use of the technology and is able to understand the pedagogic issues.

The report also identifies significant challenges with each of these strategic aims:

1. Infrastructure is often maintained by educationalists at a cost to educational direction and outcomes, and hampered by limited network and broadband capacity.
2. Content is predominantly provider determined with little differentiation for the end user, and there is too small a range of genuinely interactive multimedia content.
3. There are islands of excellence and developing teacher capacity and confidence with regard to practice, but much is still to be achieved and there is insufficient communication of good practice.

On the subject of ICT and Inclusion, the report recognises

"...the need to take greater account of the complex interactions between inclusion and educational technology, particularly with regard to learning outside the formal school setting." (BECTa, 2001:12)

The report also acknowledges that the wider social effects of technology are bound to impact on teaching and learning. It was identified that the national curriculum and the current schooling structure, were felt to restrict the 'dynamic use of technology and its potential to increase motivation'. It was felt that motivating students who are 'switched off' from learning was a key area that could benefit from learning materials that were not necessarily based directly on the curriculum. A suggestion was made that rather than trying to reintegrate excluded students back into the mainstream system, the aim should be to 're-engage their interest in learning'. A case was made for more creative approaches to involvement with learning and research methodologies of an 'intervention design' action research approach were called for. It was felt that this approach would allow researchers and designers to refine practice as it developed.

The second conference organised by BECTa was in conjunction with TEEM, a working group set up by the Department for Education and Skills (DfES). This conference focused specifically on *Exploring the Potential of Computer Games in Education*. A report by McFarlane, Sparrowhawk & Heald (2002) on research into the educational use of games was presented, being the first of its kind in the UK. This research project evaluated a range of current leisure software products²¹ with a range of pupils, teachers and parents from eight primary and four secondary schools drawn from regions across the country. The results support an overall consensus that software games did contribute to children's learning across all key stages of education. The nature of the learning supported by games use was broadly divided into three types:

- Learning as a result of tasks stimulated by the content of the games
- Knowledge developed through the content of the game
- Skills arising as a result of playing the game, both as direct and indirect learning.

The games used in the evaluation were found to vary in the amount of content they contained which was of direct relevance to the school curriculum. This was often found to be low. The games found to be of greatest potential in content relevance were *simulations*, but there was concern about the models driving the current range of products and the extent to which they replicated real world models. Future use of the evaluated products was felt to be more likely to be beneficial as an extra-curricula activity due to the time needed to devote to complex simulation games. There was general recognition across the age range that games supported the development of a wide range of skills which are essential to the autonomous learner, for example, problem solving, sequencing, deductive reasoning and memorization. Other skills were apparent due to the learning context, for example, when children worked in groups, illustrating peer tutoring, co-operation, collaboration and co-learning. In particular the discussion around the game task was highly valued throughout since it led to the development of negotiating skills and group decision-making as well as respect for peers. (McFarlane, Sparrowhawk & Heald, 2002)

Teacher evaluators described the curriculum relevance of the games that were used at different key stages. Some of the specific curriculum objectives that the software games were considered to support at Foundation Level were:

Personal and Social Development

- Provide interest and motivation to learn
- Maintain attention and concentration levels
- Can work as part of a group and can learn to share resources

Language and Literacy

- Encourage children to explain what is happening
- Sustain attentive listening, responding to what they have heard by relevant comments, questions or actions
- Use talk to organise, sequence and clarify thinking, ideas, feelings and events

Mathematical development

- Use everyday words to describe position

Creative Development

- Recognise and explore how sounds can be changed, sing simple songs from memory, recognise repeated sounds and sound patterns and match movements to music
- Respond in a variety of ways to what they see, hear, smell, touch and feel
- Use their imagination in art and design, music, dance, imaginative and role play and stories

Knowledge and understanding of the World

- Use early control software to investigate direction and control

Physical Development

- Fine motor control can be developed with the increased refinement in using a mouse for navigation and selecting objects.

(McFarlane, Sparrowhawk & Heald, 2002)

Key stage 2 evaluators found that it was difficult to identify specific targets within the curriculum that the games directly served. However, there was evidence from a number of evaluators that the games were seen as a valuable tool for skill development and collaborative working, the main examples given were; communication skills, the skills of planning and strategy as well as some in estimating and budgeting.

Skills identified within a business simulation game evaluated at Key stages 3 and 4 included:

Communication: communication within the game is important and the setting up of scenarios/the hiring and firing of staff/playing the markets – all generate discussion and debate amongst pupils.

Application of number: budgeting is a critical part of the game; quite clearly it lends itself to the delivery of application of number.

Working with others: as for communication

Problem Solving: this lies at the heart of the game as pupils make the appropriate decisions that will keep them in the game.

Financial Capability: as with application of number, a sound understanding of numeracy is critical to success in the game.

It was found that teachers needed both to recognise and map the relationship between activities in the games and the associated learning before they could embed the use of the game within the wider learning context. For current leisure software products, this would require a knowledge of the game which the teachers would have to find the time to develop. The greatest obstacle to integrating games use into the curriculum was found to be the mismatch

between the skills and knowledge developed in current games and those recognised explicitly within the school system. (McFarlane, Sparrowhawk & Heald, 2002) At the conference, it was felt that a positive contribution could be made to games design if more academics, psychologists and teachers were to be involved in the creative process of software games design.

One final quote from BECTa's earlier associated research work, featured at the conference and summarises the general findings of the study;

"Teachers in the study found that the use of games could provide motivation, develop skills and encourage collaboration. The motivating power of games and their ability to encourage co-operation were felt to support the work of schools in developing independent but social individuals". (Dawes & Dumbleton, 2001:8)

In a document produced by the Department for Education and Skills in 2002²², the '*School of the Future*' was described as being an 'ICT-rich' environment. Careful consideration was however considered necessary for a number of basic issues; connectivity, networking, specialist furniture, ventilation and energy efficiency, in addition to the implications of increased use of technologies for presentation and video conferencing. Future schools could potentially opt to combine the use of ICT in classrooms with parallel access to complementary facilities in open learning centres that would also incorporate library resources. It is suggested that this could lead to the development of 'satellite' centres focusing on particular subjects in the future.

The challenge of space constraints was identified by the report as particularly relevant in smaller primary schools. It was felt that this would potentially encourage the use of portable computers or devices. This in turn would lead to further implications for security and safe storage when these devices are not being used.

"I can imagine a scenario where people carry small hand-held devices which ... connect to the Web or larger display units or keyboards." (A primary school teacher, DfES & NgfL 2002:25)

It is interesting to observe that we do indeed have products on the market today, in 2004, which could allow such portable transportation of information and creative content within an early learning environment. However, obstacles and challenges still remain in today's technological society and the prospect of a truly smooth flow of traffic on our current systems and the 'information superhighway' is still unfortunately a *virtual* reality. However, the possibilities for future educational development of play in digital environments offer exciting potential. The next section of this chapter reviews some of the available theoretical work on social development itself.

2.1.4 Social Development

Triplett (1898) carried out what could be considered to be the first social psychology experiment. He studied the effects of competition during trials for bike racing, 'fishing reel turning' and finger dexterity exercises. Performance was found to be superior when the subjects were paired with others. Triplett's work was developed further in 1924, by Allport, who argued that it is the mere presence of others that is the crucial variable (*social facilitation*), and *not* the element of competition. Allport found that subjects performed better when they could see others working rather than when they were working alone. He called this form of social facilitation the *co-action effect*. (Allport, 1924)

In 1934, Mead proposed a 'Theory of Self', influenced partially by Cooley (1902, 1964), who maintains that in order to understand what we ourselves are like, we need to see how others regard us and this helps us to build up a gradual picture of who we are. Mead (1934) claims that knowledge of 'self' and others builds simultaneously and is interdependent. Mead stresses that the self is a *process* rather than a structure, and argued that humans act upon

themselves and respond to themselves and therefore are involved in a *reflexive* process. Mead proposed that the key process that helps us to represent ourselves to ourselves is *role-taking*. He argued that the only way that the idea of self can develop is if it gets outside of itself, in order to observe ourselves from different perspectives, particularly that of other human beings who relate to us. Mead particularly distinguishes *play* from *games*, clarifying that games involve *rules*, and proposes that through *play* (which may involve the games of each character involved), a child can acquire a range of social perspectives which can then be used to evaluate his or her own behaviour. Mead stresses that this is how the socialised part of the self develops. (Mead, 1934) Murray's identification of two complementary, but frequently occurring, social needs; *Cognizance* (Inquiring attitude)²³ and *Exposition* (Expositive attitude)²⁴, could help to clarify and explain the 'reflexive process' described by Mead. (Murray, 1938)

Erikson's theory of play was reviewed earlier in this chapter (section 2.1.2) and this is linked very closely with his *Psychosocial Theory of Development*, and his *Eight Ages of Man*, first proposed in 1950. Erikson believed that development continued throughout life and added three stages to those proposed by Freud. These extra stages covered early, middle and late adulthood. Erikson criticised Freud for under-emphasising the importance of socialisation and in particular the effects of cultural acceptance of behaviour. Erikson proposed eight *Psychosocial* stages, in contrast to the *Psychosexual* stages proposed by Freud, and argued that each stage revolves around a struggle between two conflicting personal characteristics. Erikson was particularly concerned with *mental health* and stressed that each developmental stage can be transgressed by resolving the psychological crises, but that to achieve this, social and cultural factors also have to be absorbed and considered. He argued that at each new stage, a greater dimension of 'social interaction' becomes possible. (Erikson, 1950, 1963) (A summary of Erikson's stages of development is illustrated in table 2.1.2.1 earlier in this chapter.)

Erikson did agree with Freud that there is a biological basis to development and that this is genetically pre-determined. Erikson's *epigenetic principle*, derived from embryology, argues that development is ruled by a genetic structure common to all, which dictates the timetable of growth of a foetus. Erikson maintained that this principle also held for social and psychological development. He continued to stress the importance of the social and cultural environment on this development and emphasised that 'growing up' is a process of achieving *Ego Identity* which is made up of two aspects: an *inner focused* aspect and an *outer focused* aspect. The inner focused aspect concentrates on knowing and accepting oneself, where as the outer focused aspect concentrates on recognising and identifying with the ideals, norms and patterns of our cultural environment in addition to sharing 'some kind of essential character with others'. (Erikson, 1968)

Language is an important cultural factor that is essential for successful social interaction, yet it varies enormously even in a relatively small geographical area. It is dependent on many influences including those of peer sub-groups and family traditions. This thesis does not attempt to discuss language in its entirety, however when considering a common universal language, or means of communication, it is interesting to note that Ekman (1971) identifies six primary emotions which are recognised universally, since they are expressed facially in the same way, and are understood by people from a diverse range of cultures. They are therefore believed to be innate qualities of human beings, and are expressed as; happiness, disgust, surprise, sadness, anger and fear.

Emotion plays a large part in our communication with others. Often our emotions are read by close family or friends via body language rather than by spoken words. Our feelings or emotions can also conflict with the expected behaviour at a particular time. Thus social contact can often be a catalyst for facing who we are and establishing identity, since the views and reactions of others can influence our behaviour. We can also find ourselves contradicting 'social norms', that is; generally accepted ways of thinking, feeling or behaving

that are endorsed and expected because they are perceived as the right and proper thing to do. Social norms are rules, values or standards shared by the members of a social group that prescribe appropriate, expected or desirable attitudes and conduct in matters relevant to that group. (Turner, 1991)

Lifespan developmental psychology emerged during the last two decades of the twentieth century. The main themes of the theory focus on; promoting a multi-disciplinary approach to studying human development; recognising the need to study human ecology and contexts in human development (e.g. geographical, historical, social and political circumstances); a concern with the way in which individuals and groups influence each other; and the importance of individuals as *active agents* in their own development. This approach of treating young people as *active agents* in their own development was introduced by Selman (1980) and suggests that adjustments in adolescence have a profound effect on later adult development. Selman argued that because an individual has to cope with a vast amount of change during adolescence, these adjustments require *coping processes* to be developed and it is these processes that are likely to be reused to respond to further challenges at later stages of life. The theory stresses the importance of *dynamic interaction* in social development and identifies three modes exhibited in adolescent behaviour;

1. *stimulus* – eliciting different reactions from the social environment.
2. *processor* – in making sense of the behaviour of others.
3. an *agent, shaper and selector* – by doing things, making choices and influencing events. (Selman, 1980)

Hendry (1993) claims that adolescence is the first phase of life requiring and therefore stimulating;

“..mature patterns of functioning and the development of a clear-cut personal and social identity that persists throughout life.”

(Hendry, 1993:13)

Hendry also reminds us that failure to cope effectively with the pressures of adolescence can result in 'deficiencies' in the self-concept of an individual, which will inhibit their subsequent social and psychological development.

It is clear that human behaviour, when interacting socially is quite different from behaviour when alone. Social motives can manifest themselves in all kinds of ways and exhibit many different influences. Interestingly, Hendry (1993) attempts to understand the lives of adolescents within the terms of Coleman's *focal theory of adolescent development*. This theory argues that adolescents mature by confronting a range of challenges from different sources which include: gender identity, peers and parental authority. Coleman concedes that 'adolescence is a period of both role transition and role conflict', but argues that most do somehow cope with this transition successfully. (Coleman, 1980) Through research and the subsequent development of his 'focal' model, Coleman explains how they cope;

"The answer which is suggested by the 'focal' model is that they cope by dealing with one issue at a time. They spread the process of adaptation over a span of years, attempting to resolve first one issue, and then the next. Different problems, different relationship issues come in to focus and are tackled at different stages, so that the stresses resulting from the need to adapt to new modes of behaviour are rarely concentrated all at one time." (Coleman, 1980:207)

Among young people, there is a clear need to assert and confirm a unique identity. Hendry (1993) maintains that the peer group usually has most influence over expressive behaviour and in contemporary society, there are strong ideas about acceptable work, health and leisure lifestyles. According to Hendry;

"Lifestyles can be regarded as the product of interactions amongst a complex network of interdependent factors. They are the means through which individuals assert and confirm their position within society.

Understanding adolescent lifestyles consists not only of gauging young people's behaviour but also includes understanding their attitudes, values and orientations in relation to the material and cultural resources available to them." (Hendry, 1993:166)

Hendry (1983) produced an adaption of *focal theory* that suggests that external social factors are as important as personal internal factors when determining social, relational behaviour. Hendry argues that *self-concept* is dependent on *feedback* which may be positive or negative and will subsequently lead to a state of agreement or conflict. It is this level of detail that Hendry's theory concentrates on, stating that feedback can lead to learning and result in changed behavioural patterns, altered attitudes and beliefs and to the development of a more stable self-concept. The social circumstances of a person can contribute greatly to their psychological development. Hendry cites the example of becoming independent of your parents, as this can have both sociological and financial implications as well as psychological. Hendry argues that in circumstances of economic deprivation, there is little doubt that it would be more difficult to control an adolescent's healthy adjustment. Unpleasant situations imposed on individuals can often provoke feelings of being out of control or unable to control events. Hendry claims that this can then contribute to conflict in close personal relationships with friends and family members, burdening a young adult with additional stress (Hendry, 1993).

Argyle (1996) argues that 'the power of socialisation is considerably greater than that of personality' when discussing leisure activities (Argyle, 1996:151). He cites *acquiring the interest* and *acquiring the skills* as being the most important forms of social influence on behaviour and specific leisure interests. Argyle claims that an important aspect of social learning is *skill learning* and

discusses how being good at a particular leisure activity results in more satisfaction from it and more participation in it. (Argyle, 1996)

Argyle's research spans decades and is vast in detail, so no attempt can be made within the scope of this thesis to do it justice. However, his study of leisure could prove to be a valuable source of rich information for designers of contemporary technology. He argues that 'leisure is one of the most important sources of identity' (Argyle, 1996:172) and quotes observations on devoted amateurs of theatrical, archaeology and baseball as reporting that their leisure activity provided development and enrichment of their self-concepts and feelings of actually becoming more of a person.

Argyle also identifies the importance of leisure for certain groups within society. He claims that leisure could make a substantial contribution to the treatment of mentally or socially challenged people by utilising play for social learning. Argyle argues that for those whose work does not give them a social identity, leisure can be the only source of life interest available. He claims sociologists would argue that;

"...in modern mass society there is a need to form a self-image from more 'vivid and emotionally gripping attachments' than are readily available."
(Argyle, 1996: 172)

Ackerman (1999) claims that social play establishes rank, mate-finding, and cooperation when needed. Ackerman also identifies the way that certain 'leisure' activities resemble *deep play*. Games, sports, religion and art, she argues, have much in common and are potentially interchangeable activities. Within a social context Ackerman states that:

"We evolved through play. Our culture thrives on play. Courtship includes high theater, rituals, and ceremonies of play... Language is a playing with words until they can impersonate physical objects and abstract ideas. Animal play serves many purposes. It can be a dress rehearsal for adult

life, as when young mammals play courtship games, war games, socialising games, motor-skills games... Play is far older than humans. It's so familiar to us, so deeply ingrained in the matrix of our childhood, that we take it for granted." (Ackerman, 1999:4)

Another area taken for granted for a long time, is the human response to stress itself. As identified by Hendry (1993) and Argyle (1996), socialisation can induce stress, particularly in adolescence when the adult mind is at its crucial stage of formation. In an ever-changing world, keeping up with the multitude of societal and personal demands made upon us, it is common for behaviour to be affected by stressful circumstances and environments.

Recent research by Taylor, Klein et al (2000) identified that prior to 1995, the majority of research on responses to stress had been carried out by studying male subjects. The established theory was therefore that the human stress response was that of *fight-or-flight* behavior, discussed by Cannon (1932)²⁵. Taylor and Klein's research sought to redress that imbalance and in reviewing literature from 1995, they identified and studied research being carried out in more balanced programmes. Their conclusion, that the *Biobehavioural Responses to Stress in Females* are more *Tend-and-Befriend* rather than *Fight-or-Flight* is verified by substantial references to over 200 studies of physiological and neuroendocrine responses to an acute experimental stressor conducted between 1985 and 2000. (Taylor, Klein, et al, 2000) This research is particularly interesting since it highlights how easily assumptions are made about the human responses to situations involving stress and excitement. Perhaps the new catch-phrase, that has emerged from this research; 'fight, flight or unite', will provide a new philosophical perspective on human responses.

Musick (2000) argues for the philosophy of *social activism*, that is not victim-orientated. She identifies that youth development needs 'new blood' in order to have any significant and lasting impact on young people's lives. Musick claims that this should be achieved by incorporating different people and organisations

with new perspectives. Musick's study focuses on projects that work with socially isolated children, particularly those from low income and minority youth groups. The findings reveal that the majority of programs offer services to reduce or prevent problems, but few offer environments that encourage *social activism*.

"Social activism promotes the acquisition of valuable personal skills because it builds on the natural idealism of adolescence and fulfills the need to be engaged in something useful and real, versus artificial or "make-work". It is developmentally appropriate because it crosses disciplines and artificial boundaries.....youth acquire a range of competencies as they name (identify) social, economic and environmental inequities, and go about trying to change them." (Musick, 2000:8)

Musick claims that social activism is a way to promote positive risk taking and to question or reinforce goals, behaviours and norms. In addition, she argues that the philosophy of social activism is important since it views young people not as victims of their circumstances, but as having control over their own lives.

A very recent opinion given by Sylwester (2003)²⁶ is that the development of the human brain can be divided into two periods of around ten years each. During the first phase, from birth to about age ten, Sylwester claims that the brain focuses on how to be a human being, including learning movement, communication and how to master basic social skills. The second phase, from about age eleven to twenty, is mainly concerned with learning how to be a productive and reproductive human being, considering career options and exploring emotional commitment, relationships and sexuality. (Marcinkiewicz & Sylwester, 2003)

In an interview with Marcinkiewicz, Sylwester argues that we have a limited brain, yet are interested in what is beyond our brain's limitations. He argues that curiosity has led to technology:

"Consider that organizational functions of our brain and the great variety of technologies we have developed to get beyond our limitations – technologies that regulate things, enhance sensory input and motor output, and remember/analyze/organize information for decision-making. We can almost think of technology as another layer of the brain on the outside of our skull that extends performance beyond the limited capabilities of the brain on the inside – capabilities that mature during our extended juvenile development." (Marcinkiewicz & Sylwester, 2003:1)

Sylwester argues that the development of *competence* during the first ten years is displayed in increasingly rapid automatic responses to challenges, whereas during the second ten years, that is during adolescence, competence is characterized by delayed and reflective responses that are processed in the frontal lobes. The 'instant-gratification' responses of a pre-adolescent therefore gradually give way to a less impulsive response of a maturing adult who learns to consider options and social implications before making a response. (Marcinkiewicz & Sylwester, 2003)

With regard to technology in society, Sylwester expresses an interest particularly in the interface between our brain and the technologies and cultures it develops. He argues that;

"An immature brain must practice key human skills to reach the mastery level required in a society that uses technological substitutes to override brain limitations." (Marcinkiewicz & Sylwester, 2003:2)

Sylwester claims that children use informal play and games to master technological skills during the first ten years of development and then seem to focus on how best to use these skills, particularly how to improvise them, during the second decade. He suggests that mastery of technology appears to be a two-stage process that has parallels in the way that the brain itself matures.

Sylwester argues that today's youngsters have to master cyber space and time in addition to natural space and time. He considers the Internet as a giant video game and claims that once children have mastered the computer control technology and organisation of cyber space through video games during the first ten years, they then move onto the Internet at around age twelve, where they prefer more autonomous and perhaps more risky *frontal lobe* exploration. Sylwester argues that it is important during these formative years for adults and parents to help young people develop an 'internal judgment of what's useful and appropriate on the Internet' in the same way as we help students develop a critical sense of published literature.

Sylwester also argues that the new technologies are creating complex issues that society will have to address; issues of privacy, intellectual ownership, censorship and funding, to name a few. He also claims that the challenge for higher education is to help youngsters recognise the difference between *Can I do it technologically?* and *Should I do it?* Sylwester (2003) explores the many ways that educators can develop a culture of collaborative exploration.

Sylwester claims that:

"We're living in a period of unprecedented rapid advance in science and technology, and so schools must shift from the previous perspective that the adults have all the answers and the students should learn them. That naïve notion works well for a question like "How much is 6×5 ?" – but it doesn't work for the serious moral, political, economic, and cultural issues without obvious solutions that are confronting our society."

(Marcinkiewicz & Sylwester, 2003:4)

Sylwester's argument for shifting classroom management from an administrative function to a curricular function, therefore providing students with an 'extended laboratory' for learning how to make decisions within a social environment, is based on his theory of the two separate periods of development. He argues that making decisions about where and when to do something, or who should do it for example, are important to frontal lobe

maturation, in the same way as crawling is important when mastering mobility. Sylwester therefore strongly advocates collaboration in decision making, both in the classroom and in the family, wherever it is possible to usefully and genuinely involve the young. He claims that it is the young that are most likely to be innovative, once they have understood the basic scientific and technological principles, and before they have settled on established paradigms. Sylwester argues that it is the

"...reciprocal process of apprenticeship that will lead us toward greater success in using technology to enhance the learning experience".

(Marcinkiewicz & Sylwester, 2003:5)

2.2 Comment on literature reviewed

The wide range of theoretical and empirical research reviewed in this chapter illustrates a diverse emphasis of focus regarding the role of motivation and play in human behaviour, learning and social interaction.

In summary, with regard to motivation, all of the theories reviewed provide useful information on what potentially drives human beings. There appears to be general agreement though, that 'seeking pleasure' or improvement and 'avoiding pain' are at the root of most behaviour.

Several of the psychologists reviewed, provide theoretical work on motivation, play, learning and social development that is considered more relevant and useful in the discussion and context of this study. Murray (1938), in his work identifying motives, discusses manifest and latent needs and regards play as an expression of these needs. He describes how this expression can be seen in many different forms including role-play and artistic expression. Murray stresses the importance of interaction with the surrounding environment or social group, and lists play as one of the psychogenic needs, maintaining that it is an activity

which helps us to avoid serious tension. He also identifies two needs important in social interaction; *an inquiring attitude*, which encompasses exploration, satisfying curiosity and seeking knowledge (all of which are part of learning); and *an expositive attitude*, that is relating facts, giving information, explaining, interpreting and lecturing (all part of teaching). (Murray, 1938) This view of social interaction as a *reflexive process* is similar to that of Mead (1934), who believed that through play a child can acquire a range of social perspectives which can then be used to evaluate one's own behaviour.

Maslow (1954, 1970) provides a holistic-dynamic theory which identifies two motivational forces; the *deficiency* needs, which satisfy basic needs, and the *being* needs, which are intrinsically satisfying. Maslow claims that the being needs promote a person's self-actualisation, or the realisation of their full potential. Importantly, Maslow classified esteem needs as part of the deficiency needs group; that is one of the basic survival needs. He identifies *competence* as one of the esteem needs and stresses that it is essential for confident interaction in the world, and for independence and freedom. Maslow makes a good case for the human growth and development being a life-long process. He encourages psychology to study the 'active agent' in humans as well as the 'pawn', in order to explore how we develop positive traits of character such as 'autonomy, growth tendencies and the maturation of inner forces'. (Maslow, 1954, 1970:291) Maslow identifies play as either 'coping' or 'expressive', and that it is a phenomenon of 'being' rather than striving.

White (1959) claims that the competence motive is the master reinforcer of motivation, stating that it often involves a search for stimulation, rather than a search for tension reduction. This search for stimulation at a basic level leads to a curiosity drive (Butler, 1954) which involves playful exploration and continual adaptation with the environment and people around us. White talks of a 'feeling of efficacy' when describing the satisfaction we feel during a trend of behaviour that is competently adapting to the dynamic changes invoked by interaction with our environment. He termed this 'effectance motivation'. White maintains that

competence remains a continuous motivator throughout life. Deci and Ryan's (1985b) claim that competence enhances intrinsic motivation, contributing to a person's autonomy and making them more likely to engage in new activities, should also be noted.

The literature review also reveals agreement by many of the writers on the potential for play as a beneficial activity in both individual learning and social development. Huizinga, (1944,1955) regarded play as the origin of culture and identified that play can be serious and can lead to the creation of new social institutions. He was concerned that twentieth century life had lost much of the play element, although perhaps it has just shifted to new cultural forms. Tudor Hart (1955) expressed strongly that play was needed for a child to learn to know their world, and that play comprises of learning, training and practicing new skills. She was concerned about how play can be impeded or helped by adult intervention, which clearly illustrates the importance of careful design of play environments. Tudor Hart maintains that through play a person gains confidence, self-reliance, initiative and independence and that importantly, through play we make social contact with our peers and learn how to operate as part of a group.

Freud (1955) believed that much play is the special use of defense mechanisms that manifest themselves in projection, displacement, regression and sublimation. This seems similar to Erikson's view that play is an attempt by the individual to resolve current psychosocial crises. Erikson (1950,1963) stressed that play has a crucial social quality and is not limited to childhood but is also clearly evident in adults. He claims that play is an important form of self-expression and helps us to master new developmental stages. Interestingly, Erikson also claims that play involves self-teaching and self-healing and that people seek pseudo identities in play because of a loss of identity in the social climate of the twentieth century. Play deals with life experiences and attempts to repeat, master or negate these in order to organize an inner world in relation to the outer one. Erikson proposed eight psychosocial stages, during which social

and cultural factors have to be absorbed and considered. At each stage Erikson claims that a greater dimension of social interaction becomes possible.

Piaget (1951, 1970) stresses that play is an adaptive activity involving accommodation and assimilation. He identifies three kinds of play; mastery, symbolic and play with rules. Piaget states that play serves to consolidate recently acquired abilities and aids development of cognitive and social skills by continuous interaction between a person and the world. His theory clearly illustrates that learning can take place during any kind of play. (Piaget, 1970)

Ackerman (1999) clearly follows in the footsteps of Huizinga in believing that play is fundamental to evolution. She claims that the more an animal (humans included) needs to learn in order to survive, the more it needs to play.

Ackerman identifies that play invites problem-solving and allows the testing of limits and the development of strategic thought. "Survival belongs to the agile not the idle." (Ackerman, 1999:3) Ackerman argues that because we think of play as the opposite of serious we don't notice that it governs most of society in a multitude of different forms. Both Huizinga and Ackerman describe observations of play in many areas of daily life; politics, money, love, advertising and religion to name a few examples given by them.

Pavlov's (1927) identification of *conditioning* is also clearly relevant in the context of this study, since much Human Computer Interaction (HCI) has formed through conditioned behaviours which are now firmly established in the culture. However, Skinner's (1938) work illustrating both respondent and operant conditioning also reveals the potential of interaction driven by the operant or user rather than the technology. Tolman's experiments illustrating *latent learning* during exploration are also an important consideration for HCI, as is his theory of cognitive mapping, which clearly illustrates the importance and relevance of good interface design. Tolman also stresses the need to develop 'broad cognitive maps' so that we avoid narrowing cognitive focus due to too intense motivations or frustrations. (Tolman, 1948)

Vygotsky (1934,1962) also has an important contribution to make here. His work illustrates that egocentric speech and inner speech are the same; only the former is more vocal than the latter. He maintains that this 'speech for ourselves' helps serve mental orientation and conscious understanding. It could be argued that play, learning and social interaction all encompass communication with ourselves (as well as with others), and illustrate a kind of 'working or playing things out'. Bruner (1966) argues that language and logical thinking are inseparable. Clearly language plays an important part in our social development and interaction. The six primary emotions and subsequent facial expressions, identified by Ekman (1971); happiness, disgust, surprise, sadness, anger and fear; which are recognised universally, are also an interesting consideration that could prove useful in design development of inclusive interactive digital media.

Hendry's claims that social circumstances can contribute greatly to a person's psychological development and that self-concept is dependent on feedback, is also an important factor to be noted. Hendry (1983) states that feedback leads to learning and can result in changed behavioural patterns, attitudes and beliefs contributing to the development of a more stable self-concept. Argyle's argument that 'leisure is one of the most important sources of identity' (Argyle, 1996:172) and his reports that leisure activity provides development and enrichment of self-concept, agree with Hendry's claims. Argyle also maintains that leisure can make a substantial contribution to people who are socially challenged and that play has a great potential that can be utilised for social learning. Musick (2000) is also in agreement with these views on the importance of social circumstances in personal development. She calls for *social activism*, claiming that there is a need to promote positive risk taking in order to question or reinforce goals, behaviours and norms. She also maintains that social activism views people not as victims of their circumstances, but as having control over them. This is similar to Maslow's view of the 'active agent' instead of a 'pawn'.

Oblinger (2002) clarifies recent recognition and acceptance of *lifelong learning*. She identifies the shift in focus from explicit knowledge to tacit knowledge gained from experience rather than textbooks. Play offers an obvious environment for developing experiential learning situations, but as Oblinger points out, the technology, although theoretically available is not yet fully integrated with lifelong learning practice and application. This situation is improving steadily though, and the work of BECTa, the NgfL and the DfES in this field is important, particularly in managing the integration and changes involved when introducing play as a learning environment.

Sylwester's argument that competence in the first ten years is displayed in rapid automatic responses to challenges, where as in the second ten years is a more reflective response is also interesting in the context of interactive digital media development. In Sylwester's view a maturing adult learns to consider options and social implications before making a response. Sylwester claims that children use informal play and games to master technological skills during the first ten years of development and then focus on how best to utilize or improvise these skills, during the second decade. This involves autonomous and more risky frontal lobe exploration. Sylwester argues that the reciprocal process of collaboration in decision making will lead to greater success in using technology to enhance learning, since he claims that the young are most likely to be innovative as they have not become entrenched in established paradigms. (Marcinkiewicz & Sylwester, 2003)

The role of technology in the evolution of contemporary practices with regard to learning influence and societal management should not be underestimated. Both cultural and environmental factors are changing constantly and it is important that the dynamic nature of these influences on our behaviour be considered seriously. Much of the literature reviewed in this chapter provides knowledge on the central issues of understanding the user and has proved to be essential in the development of the design methodology detailed in Chapter 4 of this study.

Psychological literature provides an essential resource to designers of future technology. It opens up a vast treasure chest of potential for innovative thinking in response to the challenge of designing for future generations.

The next chapter reviews the design processes and theories that have developed during the latter part of the twentieth and the beginning of the twenty-first century, and evaluates them in the context of this study.

¹ From *De Cive*. First published in the English translation in 1651 as *Philosophical Rudiments concerning Government and Society*.

² 'Pleasure principle' - a term whose origin is attributed by Mautner (1996,2000) to Gustav Fechner (1801-87), since he used the German equivalent, 'Lustprinzip' in an article published in 1848.

³ Although Millar (1968) reports that homeostasis was first named by Fechner in 1873.

⁴ The main features of Cannon's (1932) book *The Wisdom of the Body* were first presented in a technical article titled "Organization for Physiological Homeostasis" in *Physiological Reviews*, 1929, ix, p.399-431

⁵ Murray explains 'Noxavoidance' as the tendency to avoid or rid oneself of noxious stimuli; to look or draw away from repulsive objects, to cough, spit or vomit up irritating or nauseating substances. (Murray, 1938:77)

⁶ Murray defines 'Sentience' as the inclination for sensuous gratification, particularly from objects in contact with the body; taste sensations and tactile sensations. (Murray, 1938:78)

⁷ *Infavoidance* (Infavoidant attitude) To avoid failure, shame, humiliation, ridicule. To refrain from attempting to do something that is beyond one's powers. To conceal a disfigurement. (Murray, 1938:81)

⁸ *Similance* (Suggestible attitude) To empathize. To imitate or emulate. To identify oneself with others. To agree and believe. (Murray, 1938:82)

⁹ *Contrariance* (Contrariant attitude) To act differently from others. To be unique. To take the opposite side. To hold unconventional views. (Murray, 1938:82)

¹⁰ *Blameavoidance* (Blameavoidance attitude) To avoid blame, ostracism or punishment by inhibition of asocial or unconventional impulses. To be well-behaved and obey the law. (Murray, 1938:83)

¹¹ *Succorance* (Succorant attitude) To seek aid, protection or sympathy. To cry for help. To plead for mercy. To adhere to an affectionate, nurturant parent. To be dependent. (Murray, 1938:83)

¹² *Cognizance* (Inquiring attitude) To explore (moving and touching). To ask questions. To satisfy curiosity. To look, listen, inspect. To read and seek knowledge. (Murray, 1938:83)

¹³ *Exposition* (Expositive attitude) To point and demonstrate. To relate facts. To give information, explain, interpret, lecture. (Murray, 1938:83)

¹⁴ Csikszentmihalyi (1975) also researched *peak experience* or *peak flow*; and this will be reviewed later in this section.

¹⁵ In 1873 Fechner applied the principle of conservation of energy to living organisms and named the principle of homeostasis to describe the way that organisms keep their internal conditions in as constant and stable a state as possible. Millar (1968)

¹⁶ Diana Oblinger: An independent consultant with 10 years of experience at IBM and a previous position as vice president for information resources for the 16 campus University of North Carolina system.

¹⁷ Information Technology and the Future of Education: An interview with Diana Oblinger. By James L. Morrison and Diana G. Oblinger (March/April 2002) *The Technology Source*. US. Michigan Virtual University.

¹⁸ BECTa is a Government agency for information and communications technology (ICT) in education and supports UK Government, national organisations, schools and colleges in the use and development of ICT in education to raise standards, widen access, improve skills and encourage effective management.

¹⁹ A government headline initiative for improving schools' Information and Communications technology (ICT).

²⁰ BECTa (2001) *Helping to Create Schools of the Future*. ISBN: 1 85379 442 2

²¹ The European Leisure Software Publishers Association (ELSPA) advised TEEM of appropriate game titles to use for the purpose of the evaluation. The titles used were: Age of Empires II, Bob the Builder, Championship Manager, City Traders, F1 Racing, Freddi Fish, Lego Alpha Team, Legoland, Micro Racers, Pajama Sam, Putt-Putt Enters the Race, Rollercoaster Tycoon, Sim City 3000, The Sims, The Tweenies, The Settlers, Uno and Worms Unlimited.

²² DfES & NgfL (2002) *Transforming the Way We Learn. A vision for the Future of ICT in Schools*. Annesley. DfES Publications. (ISBN: 1-84185-658-4) Full text available at <http://www.dfes.gov.uk/ict/futures>

²³ *Cognizance* (Inquiring attitude) To explore (moving and touching). To ask questions. To satisfy curiosity. To look, listen, inspect. To read and seek knowledge. (Murray, 1938:83)

²⁴ *Exposition* (Expositive attitude) To point and demonstrate. To relate facts. To give information, explain, interpret, lecture. (Murray, 1938:83)

²⁵ Cannon, 1932:213

²⁶ Robert Sylwester, Professor of Education at the University of Oregon who studies new development in science and technology.

3 The Design Process

3.1 Literature Review

The purpose of this chapter is to review design processes in order to establish whether there are any that could prove useful for designing leisure software products. This chapter is therefore organised into three main sections; Existing Design Processes, Technology Based Design Methods, and Software Game Design Processes. Primary research with an international publishing company¹ and their development studio along with another independent development studio² were also undertaken to establish whether there were any typical methods in practise during the time of this study.

The methods included here have been selected either because they provide general design guidelines that could be applicable to the design environment of interactive digital media, or for their specific relevance to the phenomena under investigation. As with the psychological literature in the previous chapter, the review within each section is presented in chronological order.

3.1.1 Existing Design Processes

Prior to the nineteen fifties, when published design methods began to appear in most industrialised countries, *designing* was considered to be what architects, engineers and industrial designers *did* to produce drawings that were required by their clients and manufacturers. (Jones, 1970)

Jones (1970) identifies how this traditional objective of a designer, producing drawings for approval and instruction, began to change to a new definition of designing as; *the initiation of change in man-made things*. This implied that drawings could not even be started until other objectives were clarified and agreed. Jones reports that the fundamental problem for the designer is that they are required to use limited current information to predict a *future state*. Jones claims that;

“...designers have to work backwards in time from an assumed effect upon the world to the beginning of a chain of events that will bring the effect about.” (Jones, 1970:10)

Jones also puts forward the view that designing is a hybrid activity which depends on knowledge and understanding of art, science *and* mathematics for successful execution and application. He argues that design should not exclusively be identified with any one of these areas in isolation. Jones claims that an important difference for design is the factor of *time*. He argues that art and science operate on the physical world as it exists in the present, while mathematics operates on abstract relationships that are independent of time. Designers, Jones stresses, are constantly concerned with the *imagined future* and have to specify how to achieve a *foreseen* solution. Their design methods are therefore, according to Jones, like navigational tools and charts that the designer uses to plot the course of his journey into ‘an unknown land’. These tools help the designer to maintain some control over where he or she is going. Jones goes on to argue that the designer does however have to make assumptions with a lack of information, and is at the mercy of whether others will be willing to put their plans into action.

Jones (1970) describes a three-stage process, which he claims is a common design practice. The three essential stages he identifies are; *analysis*, *synthesis* and *evaluation*. *Analysis* is described as ‘breaking the problem into pieces’; *Synthesis* as ‘putting the pieces together in a new way’; and *Evaluation* as

'testing to discover the consequences of putting the new arrangement into practice'. Jones reports that it is common to cycle through this process many times during development of a design solution and that it is also usual for the development to become more detailed as the cycle repeats. However, Jones clarifies these three stages by giving them new titles that refer more to the emerging problems of system design during the 1970s, rather than to the older traditional procedures of engineering and architectural design. These renamed stages, as identified by Jones are *divergence*, *transformation* and *convergence*. (Jones, 1970) Jones stresses the importance of not considering these stages as too separate, as this would hinder the overall design strategy. He argues that their separate identification allows for potential revision of detailed methodology at each stage in order to form a reintegrated process that works beneficially for further systems design. (Jones, 1970) Jones specifies in further detail the three terms' definitions. *Divergence* is described as referring to;

"...the act of extending the boundary of a design situation so as to have a large enough, and fruitful enough, search space in which to seek a solution." (Jones, 1970:64)

Transformation is described by Jones as being;

"...the stage of pattern-making, fun, high-level creativity, flashes of insight, changes of set, inspired guesswork; everything that makes designing a delight. It is also the critical stage when big blunders can be made, when wishful thinking or narrow mindedness can prevail and when valid experience and sound judgment are necessary if the world is not to be saddled with the expensive, useless, or harmful, results of large but misguided investments of human effort. This is the stage when judgments of values, as well as of technicalities, are combined in decisions that should reflect the political, economic and operational realities of the design situation. Out of all this comes the general character, or pattern, of what is being designed, a pattern that is perceived as appropriate but cannot be proved to be right." (Jones, 1970:66)

The final stage identified by Jones, that of *Convergence*, is described as;

"..the stage after the problem has been defined, the variables have been identified and the objectives have been agreed. The designer's aim becomes that of reducing the secondary uncertainties progressively until only one of many possible alternative designs is left as the final solution to be launched into the world." (Jones, 1970:68)

Jones identifies a growing demand, originating in the early 1970's, that everyone affected by a new design should participate in critical decision making for that product, either through user research or through organisations protecting the interests of those who could gain or lose as a result of the planning and design. Jones claims that a consequence of these considerations was the identification of critical factors at an early enough design stage to implement changes that would improve the system, product or service. (Jones, 1970)

One solution to identifying critical factors was Quality Function Deployment (QFD). Developed in Mitsubishi's Japanese shipyards in the 1970's, QFD proposed a formal technique for translating customer opinion into the language of designers and manufacturing engineers of that time. This process helped development teams to 'rank' the features of a product or service in order to express the preferences of their customers. The technique comprises of constructing a series of matrices which illustrate on one dimension what needs to be included in the design and on the other dimension how this will be accomplished. The first matrix to be constructed is the *House of Quality*, which contains; customer attributes, technical requirements, customers view of competition and a technical evaluation of any competitors products or services. This matrix allows a better understanding of customer needs and expectations in addition to identifying technical requirements that work to provide customer satisfaction. (Markland, Vickery & Davis, 1998) The QFD process proceeds through four phases of development; the House of Quality, the Components

Matrix, the Process Characteristics Matrix and finally the Process Control Matrix. The House of Quality is considered the most important and is often the only matrix that companies use to reassess and implement new strategies for improvement. However, in industrial manufacturing, further more detailed analysis at component, process and control levels are understandably essential. The House of Quality component of this design method has clearly been utilised substantially since the 1970's, as it is evident in the wide scale market research questionnaires circulated through every possible medium to today's consumers.

A completely different approach proposed in 1973 by Geoffrey Broadbent, was specifically developed for architectural design, but has many generic qualities for generating a range of design solutions. Broadbent's method draws on four different ways of generating design form, called *pragmatic*, *iconic*, *analogical* and *canonic*. (Lawson, 1997) Broadbent suggests that a designer might use all four of these methods in resolving a design problem in order to select from the solutions produced. *Pragmatic* design uses the available material methods of construction, usually without any innovation. It is a traditional and conservative approach, but is low risk and likely to provide a safe solution, although unlikely to produce any ground-breaking design. *Iconic* design is an even safer approach. It effectively copies existing solutions to a design problem and reuses them in a new environment. This can have its advantages, since it can allow for established solutions to be reused to good effect rather than wasting time trying to 'reinvent the wheel' for every new design problem. However, there can also be drawbacks, particularly if a faulty design solution is reused again and again simply because it is the established way of resolving the issue. *Canonic* design relies on the use of rules such as planning grids and proportioning systems, and is particularly evident in classical architectural styles. *Analogical* design requires the designer to use analogies or imagine new contexts in order to restructure or re-think the design problem. The use of organic forms or the human body is common in this practice. Lawson reports that Broadbent considers that analogical methods produce the most successful results for form generation, but goes further to detail the use of 'narrative'

design as a form of analogical design. This method allows a design team to 'tell a story' that links together main features of a design brief or problem in order to provide a solution that makes sense within its own unique context. (Lawson, 1997)

This 'making sense' could be argued as being similar to the concept of *Reflective Practice* introduced by Schön in 1983. Schön describes design as a 'reflective conversation with the situation' and considers 'designing as a conversation with the materials of a situation. (Schön, 1983)

"A designer makes things. Sometimes he makes the final product; more often, he makes a representation – a plan, program, or image – of an artifact to be constructed by others. He works in particular situations, uses particular materials, and employs a distinctive medium and language. Typically, his making process is complex. There are more variables – kinds of possible moves, norms, and interrelationships of these – than can be represented in a finite model. Because of this complexity, the designer's moves tend, happily or unhappily, to produce consequences other than those intended. When this happens, the designer may take account of the unintended changes he has made in the situation by forming new appreciations and understandings and by making new moves. He shapes the situation, in accordance with his initial appreciation of it, the situation "talks back," and he responds to the situation's back-talk. In a good process of design, this conversation with the situation is reflective. In answer to the situation's back-talk, the designer reflects-in-action on the construction of the problem, the strategies of action, or the model of the phenomena, which have been implicit in his moves." (Schön, 1983:78)

This description of reflection-in-action by Schön, is not so much a prescribed method of design as an observation of a design process, commonly practiced but rarely recognised or recorded in detail. It is that part of design activity that draws upon knowledge, experience and intuition, but that is not generally accepted as a form of professional practice. Schön argues that reflection-in-action is not bound by technical rationality and so can be useful in situations of

uncertainty or originality, where something falls outside the range of ordinary expectations. Schön claims that when someone reflects-in-action, they become a 'researcher in the practice context' and are no longer dependent on established theory or principles, but are free to construct a new theory for a new individual case.

Schön claims that many practitioners would benefit from becoming more aware of reflection-in-action to prevent being 'locked into a view of themselves as technical experts' thereby preserving situational control and protecting their own knowledge-in-practice. Schön proposes that reflection-in-action could be linked to the 'art of practice in uncertainty and uniqueness' and subsequently to the scientific art of research. (Schön, 1983:69)

Much of what Donald Norman (1988) advocates could be considered reflection-in-action. Norman claims that:

"Much good design evolves: the design is tested, problem areas are discovered and modified, and then it is continually retested and remodified until time, energy, and resources run out. This natural design process is characteristic of products built by craftspeople, especially folk objects....Over time, this process results in functional, aesthetically pleasing objects." (Norman, 1988:142)

Norman recognises however, that time can be a major obstacle to this process of *natural design*. He describes the common situation of modern designers, who are subject to many pressures, complexities and variables that do not always allow for a slow, careful crafting process to occur. In addition to time, Norman also cites other obstacles; the lack of mechanisms for collecting and feeding back customer or user opinion, and crucially, the need to be different, both from companies or designers themselves, keen to be distinctive or stand out against competitors. This latter scenario, that of individuality, Norman considers a 'mixed curse'. Clearly innovation arises from individuality, but difference is what

distinguishes one company's product from another, so difference for its own sake is common practice in the commercial world and Norman argues that this does not necessarily lead to a 'perfect' product. Norman also argues that natural design cannot work under these circumstances (Norman, 1988).

It is clear from the reviews so far in this chapter that the attitude of the designer is fundamental to the design approach taken. Lawson argues that 'there is no infallibly good way of designing' and that 'the design solution is not just a logical outcome of the problem' (Lawson, 1997). He argues that identifying the end of a design process is the most difficult point in design since often the solution might be the best compromise that can be achieved in the time, but might still remain unsatisfactory to the designer and even to the end users themselves. Lawson agrees with Norman that the major obstacles of time, money and information can often lead to an early end to any real beneficial design process and proposes that some designers now view the process as continuous anyway.

Stoll (1999) defies Lawson's argument that there is no 'good way of designing' by defining good design as:

"...the timely design of functionally and aesthetically appealing products that have inherent high quality, low cost, and ease of manufacture."

(Stoll, 1999:1)

Stoll's work mainly concentrates on product design and so is focused on the industrial manufacturing considerations inherent in that field. Stoll advocates that it is for companies to choose which practice or process suits them best, but that it is also their responsibility to ensure that design process improvement is iterative and remains a learning process. Stoll proposes a *team approach* to design process improvement, in addition to *formal design reviews* and a *design guideline*. He argues that the team approach provides improved communication, formal design reviews impose discipline on the process and that *design guidelines* retain a common approach. Stoll claims that the best

results are obtained if those in daily contact with a project are given the opportunity to develop a process that works for them. This approach, once in place should also be continuously reviewed. (Stoll, 1999)

As this study aims to find ways of generating concept ideas for new leisure software products, at this point, some of the concept development techniques detailed by Stoll (1999) are reviewed. Although, as specified, Stoll focuses on mainly physical product development techniques, it is interesting to observe whether these techniques would be adaptable to the context of software game design. Stoll first considers *Customer Focused Concept Design* and identifies a three phase methodology that comprises:

1. Understand identify and prioritise customer need and translate them into customer focused design specifications.
2. Create explore the design space by generating numerous ideas and concepts that meet or exceed the customer needs.
3. Refine evolve the best alternative design concept by systematically evaluating and improving the ideas and concepts generated.

Stoll stresses that the *understand* phase is crucial to informing the designers of the essential attributes and technical characteristics required to help the product succeed in the marketplace. (Stoll, 1999)

Stoll recognises that concept selection is one of the most important decisions made during the design process. Mistakes at this stage can be very costly or sometimes irreversible once the product is in production. Examples of concept selection techniques given by Stoll are; 'pro and con' lists, intuitive feel, using a 'concept champion', using customer surveys or structured rating schemes and finally, building and testing prototypes. Stoll advocates that;

"..Structured rating schemes provide the best combination of discipline, flexibility and amount of time and effort required. Experience has shown that concept selection is too important to trust to haphazard approaches such as intuitive feel and yet, information is too incomplete to spend a lot of time and money on hardware models and engineering analysis, especially if there are many alternatives to consider. Structured rating schemes strike a balance between these extremes." (Stoll, 1999:122)

Stoll identified two *Formal Concept Selection Methods* which help to divide the concept decision into many subordinate decisions which should be easier to make. The two methods detailed by Stoll are the *Utility Function Method* and *Pugh's Method*. The Utility Function Method allows for a ranking to be obtained for each utility of each alternative concept by scoring or weighting the evaluation criteria of the concept under consideration. Pugh's Method (Pugh, 1991) is basically a simplified version of the Utility Function Method, since all evaluation criteria are assumed to be equally important and instead of a ranking system, concepts are given a relative score using a system of 'better than', 'same as' or 'worse than'. Pugh's method has become widely used since it is effective and easy to implement, especially when there are a large number of alternatives to consider. Stoll suggests that it is also useful as a 'screen', in order to reduce the number of possible concept alternatives for consideration.

Stoll also recognises the importance of *models* in design decision-making, particularly the role of the physical model in bringing conceptual ideas into reality and computational models in simulating the design idea. Stoll identifies four basic types of physical model; *appearance*, *behavioural*, *functional* and *design verification units*. *Appearance* models communicate how a product would look, where as *behavioural* models communicate how a design idea might be used or operated. Both of these are useful in industrial design for exploring how the user interacts with the product concept and for obtaining valuable user opinion and feedback. *Functional* models focus on the way that

the concept would actually work and are useful for establishing technical feasibility, capability and performance. Functional models do not always resemble the finished look of the product, particularly in comparison to a *Design Verification Unit (DVU)*, whose purpose is to confirm the final design. DVUs usually look *and* work like the finished product and are often not only constructed of the same materials, but also constructed by the same processes as the final product would be manufactured. This can be a very useful model to investigate tolerance, performance, materials and overall 'look and feel' of the product in order to obtain further user feedback, reaction and product evaluation. (Stoll, 1999)

Stoll stresses the importance of models in the design process, since this process answers questions and provides insights quickly and early enough to make changes effective. The goal, according to Stoll, is to 'fail early and often'; since he argues that innovation comes through experimentation. (Stoll, 1999)

The following section reviews some of the available technology based design methods that have emerged since the early 1970s. These theories and processes have arisen out of the desire to innovate and to utilise current technology to invent improved systems or products for the future. Some are specifically related to the development of technological systems design, others to the human and social factors contributing to and being affected by the design of such systems.

3.1.2 Technology Based Design Methods

There was no generally agreed approach to software development until 1970, when the *Waterfall Model* was first proposed. This model forms the basis of many approaches to software development still in use today. (Preece, 2002)

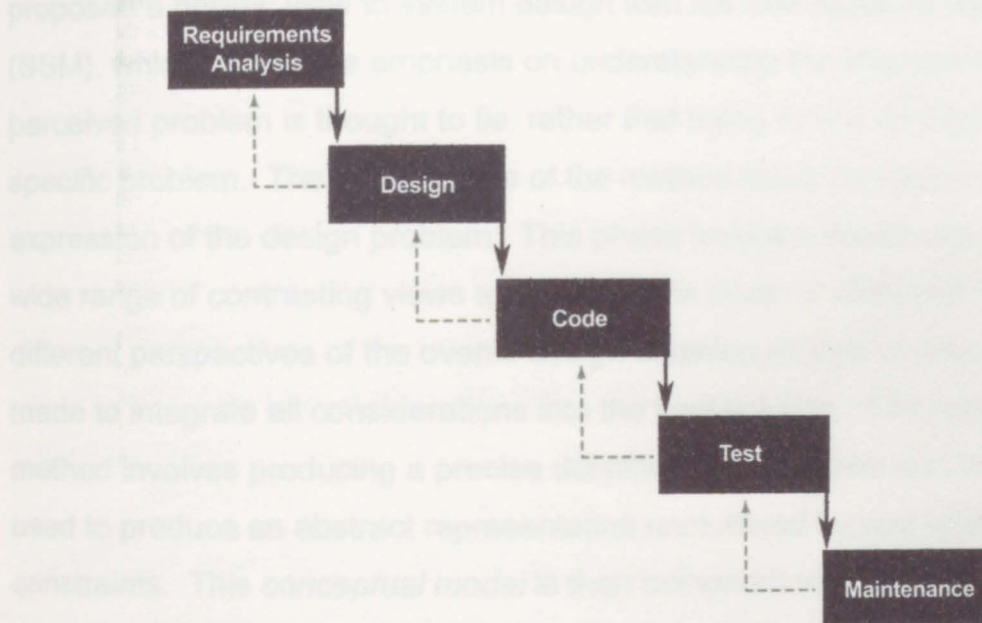


Figure 3.1.2.1 The Waterfall Model of Software Development (1970)

Following requirements analysis, a requirements specification document is produced, which acts as a sort of 'contract' between client and developer. This agreed specification allows for design to begin, and a representation of the system to be developed. This illustrates all levels of the system and allows further development through coding and testing. If the system design is accepted by the client then maintenance and refinement processes are also implemented to further enhance the product.

The main criticism of the waterfall method is that it lacks any real opportunity to understand user requirements until quite late on in the process, after substantial

design has taken place. However, during the 1970s system designers began to be able to prototype systems using newly developed software and this meant that design could be checked with users before too much detailed and expensive development and programming work took place. (Preece, 1994)

In 1981, Checkland took this user consultation a stage further when he proposed a holistic view to system design with his Soft Systems Methodology (SSM), which placed the emphasis on understanding the situation in which a perceived problem is thought to lie, rather than trying to find one solution to a specific problem. The initial stages of the method focus on obtaining a detailed expression of the design problem. This phase involves stakeholders with a wide range of contrasting views and opinions in order to understand all the different perspectives of the overall design situation so that an attempt can be made to integrate all considerations into the final solution. The next stage of the method involves producing a precise definition of the system and this is then used to produce an abstract representation uncluttered by real-world constraints. This *conceptual model* is then compared with the original expression of the design problem and the final stages of the methodology involve a reiteration of the process until a solution is reached. (Checkland, 1981)

The *conceptual model* produced as part of Checkland's methodology could be considered to represent a *mental model* of the system. The term *mental model*, was first introduced in the 1940s by Kenneth Craik when he proposed the notion that thinking '...models, or parallels reality'. (Preece, 1994:130)

Preece clarifies Craik's proposal with the explanation;

"...we build mental models of the world in order to make predictions about an external event before carrying out an action." (Preece, 1994:131)

Preece also clarifies Johnson-Laird's (1983), claim that mental models, in terms of structure, comprise of either *analogical* representations alone, or a combination of *analogical* and *propositional* representations;

"A mental model represents the relative position of a set of objects in an analogical manner that parallels the structure of the state of objects in the world." (Preece, 1994:131)

Mental models are distinct from mental images alone since they are usually constructed when a prediction or inference is required about a particular situation. The mental model allows for a *simulation* to be imagined from which conclusions or evaluations can be deduced. A mental image, on the other hand is considered to be more like a still image from that simulation or from memory. The dynamic nature of mental models is therefore particularly important and should be noted.

The aim of *Hierarchical Task Analysis* (HTA) is to construct a graphical representation, in much the same way as a mental model is constructed, to illustrate the decomposition of tasks, subtasks and operations within a system design. (Preece, 1994) *Cognitive Task Analysis* is concerned with informing the design process through the application of cognitive theories, recognizing that some tasks are physical and some cognitive. Cognitive Task Analysis aims to model the internal representation and processing that occurs. Some of the models that have arisen from this psychological viewpoint of technological design are the GOMS (goals, operations, methods and selection rules) model (Card *et al.* 1983), the TAG (Tasks Action Grammar) model (Payne and Green, 1989) and the KAT (Knowledge Analysis of Tasks) method (Johnson, 1992).

The GOMS model comprises descriptions of specific methods or plans that are needed to achieve specified goals. The model includes selection rules which help to identify the most appropriate method to achieve a goal, should there be alternatives available. The GOMS model can also be applied at various levels of

abstraction, just as Hierarchical Task Analysis works at all levels of task identification and splitting of tasks into more manageable sub-tasks. The TAG method is concerned with evaluating the learnability of systems and the KAT technique focuses on identifying knowledge relevant to a task.

Preece (1994) reports a shift away from these highly formal techniques during the late 1980s and early 1990s toward much less detailed methods in response to a concern that they did not really confront the reported issues raised by users. Among the examples of this shift are approaches such as *claims analysis* (Carroll and Kellogg, 1989), *scenario analysis* (Young and Barnard, 1991; Carey *et al.*, 1991), *cognitive walkthroughs* (Lewis *et al.*, 1990) and *design rationale* (Carroll and Moran, 1991; Maclean *et al.*, 1991). In addition Green's (1989) *cognitive dimensions* framework was designed around this time to provide a *simple vocabulary for describing aspects of information structures* (Green, 1989; Preece, 1994).

The notion of mental models has provoked much interest for the design field of human computer interaction (HCI), particularly since the development of *direct manipulation* techniques, first commercially demonstrated on the Macintosh personal computer in 1984 by Apple Computer, Inc. With this interface, users could finally control the system functions via analogous objects placed on an analogous desktop. Continual feedback, both visually and audibly also helped to inform and update the user on their actions, keeping them in control. Norman and Draper (1986) also suggested a direct application of the principle of mental models to interface design.

Figure 3.1.1 The Spiral Model of Software Development (Boehm, 1986)

With the rise of prototyping software, user evaluation and the time consuming review of designs, new problems of management control arose which gave rise to further proposals for software development processes that needed to be clarified.

Boehm (1988) responded to this need by proposing a *Spiral Model* of software development. Boehm's model incorporates both *prototyping* and *risk analysis* in a repeating framework that allows ideas and progress to be checked and evaluated on an iterative basis.

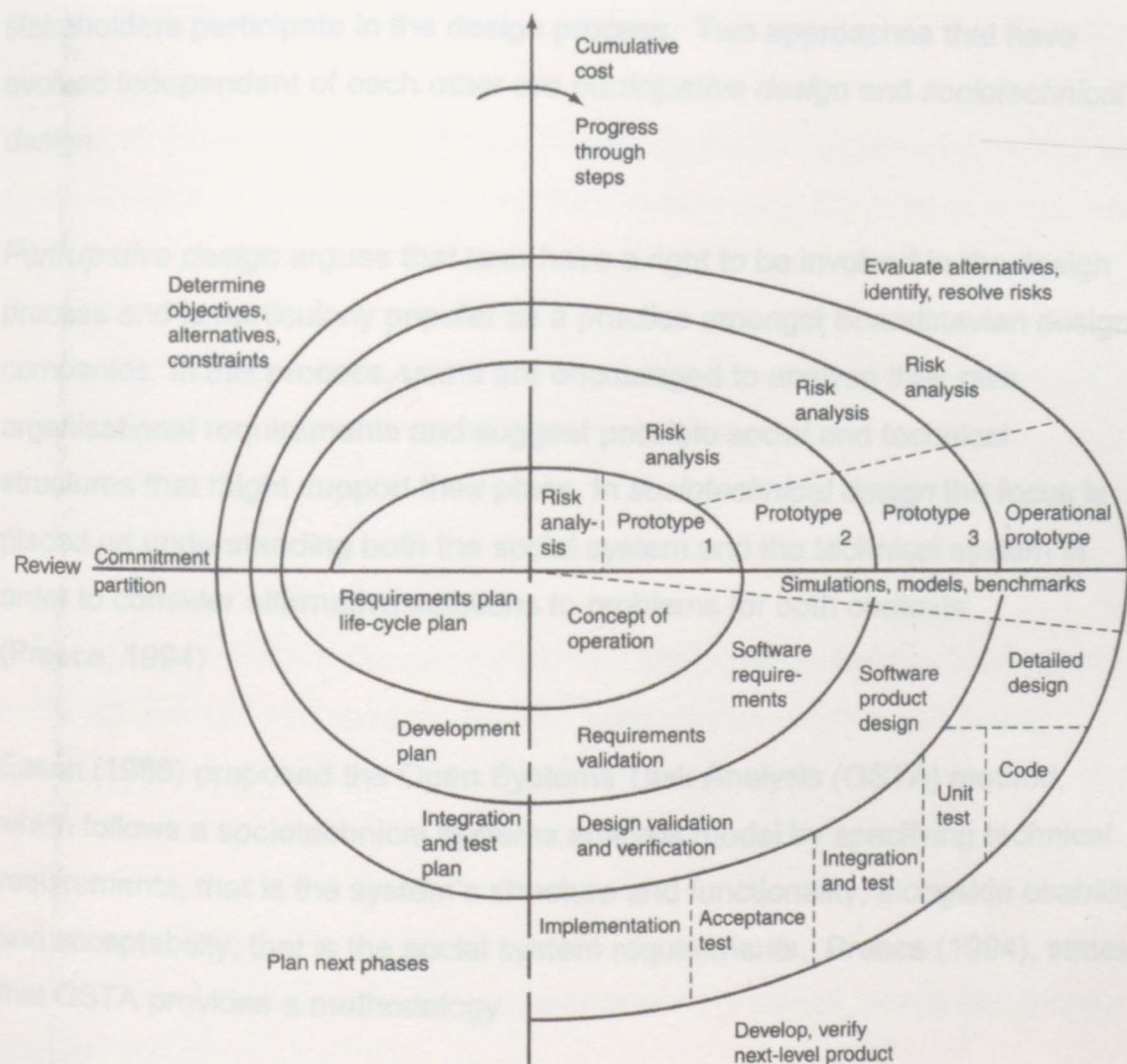


Figure 3.1.2.2 The Spiral Model of Software Development (Boehm, 1988)

The main concern for Boehm was to identify and control risks, while still encouraging alternative designs to be considered. Rather than intended functionality, development plans and specifications are focused on the risks involved in the development of the system, therefore problems or obstacles are faced and dealt with throughout each iteration of the cycle.

During the 1980s, the importance of considering the wider context and consequences of systems and software development was gaining support. (Checkland, 1981, Suchman, 1987, Boehm, 1988) Several approaches emerged that involved what is often termed *cooperative design*, where users or stakeholders participate in the design process. Two approaches that have evolved independent of each other are *participative design* and *sociotechnical design*.

Participative design argues that users have a right to be involved in the design process and is particularly popular as a practice amongst Scandinavian design companies. In this process, users are encouraged to analyse their own organisational requirements and suggest possible social and technical structures that might support their plans. In *sociotechnical design* the focus is placed on understanding both the social system and the technical system in order to consider alternative solutions to problems for both contexts.

(Preece, 1994)

Eason (1988) proposed the Open Systems Task Analysis (OSTA) method, which follows a sociotechnical systems analysis model by specifying technical requirements, that is the system's structure and functionality, alongside usability and acceptability, that is the social system requirements. Preece (1994), states that OSTA provides a methodology

“...for understanding the transformation that occurs when a computer system is introduced into a working environment.” (Preece, 1994:376)

There are eight steps involved in Open Systems Task Analysis (OSTA). The first step is to identify the *primary task* of the system in addition to the goals of the users. Secondly, *task inputs* are identified. These can be of variable content, but all possibilities must be considered, since the system will have to incorporate them all in order to achieve the primary task.

In 1990, Nielsen and Molich, adopting an heuristic evaluation approach,

The third step of OSTA is to consider the *external environment*, which includes physical, economic and political factors, in order to establish the structure of the task output. Next, *transformation processes* are constructed that illustrate, usually via flowcharts or diagrams, what actions are to be performed on which objects, in order to transform the inputs into the required outputs.

4. Viability of system status

The fifth step in the OSTA method is to analyse the *social system*, detailing the characteristics of the end users in addition to assessing the roles of individuals within the organisation or social environment and their relation to each other.

During the sixth step, the *technical system* is analysed, with consideration particularly being given to how the new system will be integrated with the old system (if applicable) and importantly to other systems within the social network. The effects and consequences of the operation of the new system on the organisation or social environment are also considered in this phase.

5. User control and freedom

Stage seven of OSTA is concerned with the *performance satisfaction* and refers to the requirements planned for the new social system once the technical system is introduced. Finally, in stage 8, the requirements for the new *technical system* are derived from the task analysis. *Functionality* is defined and *usability* and *acceptability* criteria are set, roles can then be allocated between the technology and the people operating the system, in addition to initial specification of the structure of the interface and the training needs of the users (Preece, 1994).

6. Error prevention

The structure of an interface is crucial to the effective communication between user and technology. Jakob Nielsen has, since the early 1990s conducted an enormous amount of research on the usability of system interfaces and particularly on the usability of the rapidly developing Internet, which is undoubtedly the largest of all socially accessible systems ever and probably the most controversial.

Information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

In 1990, Nielsen and Molich, adopting an *heuristic evaluation* approach, proposed *Ten Usability Heuristics*, which were particularly aimed at designers of internet systems and websites. (Molich & Nielsen, 1990; Nielsen & Molich, 1990) Subsequent revision of these initial guidelines, resulted in the following checklist for designers in this field:

1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-orientated terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

6. Recognition rather than recall

Make objects, actions and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. Flexibility and efficiency of use

Accelerators, unseen by the novice user, may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognise, diagnose and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out and not be too large.

(Nielsen, J. 1994a & 1994b)

Although some might seem generic, these guidelines are one of the more detailed sets of instructions on *designing for usability* that are available. Systems design seems to have fought off user consideration for as long as possible, in favour of technological capability. However, the arrival of the Internet poses a real challenge to the designers of new technology, in that the users have the ultimate choice on the Internet of where to navigate and which sites to avoid. Nielsen argues that easy use of the interface of any website goes a long way towards retaining visitors to that site. (Nielsen, 2000)

This simple principle can also arguably be applied to any software application, whether an informational, educational, organisational or leisure product.

Design approaches involving users and considering social consequences can prove to be very challenging and time consuming, which can be costly. There has to be real commitment by the client or management in funding such development if these concerns are to be addressed fully.

Bucciarelli (1994) claims that the process of design *is* a social one and that fixation on the physics of a device promotes the object as an icon in the design process. He describes this as "object-world" thinking. (Bucciarelli, 1994:5)

Bucciarelli also states:

"Others have looked at the design process, or at invention and innovation, or at the diffusion of technology, and sought to explain how and why technology takes the form we see and experience. There are two basic perspectives on the topic, and I like to characterize them as the perspectives of the *savant* and the *utilitarian*." (Bucciarelli, 1994:13)

Bucciarelli explains his views; a *savant*, tries to reconstruct the design process of a device by focusing on the completed, fully functioning artifact and being guided by the principles and laws of science. However, in contrast, the *utilitarian's* vision of who and what determines the form and function of a technology starts from the marketplace and lets the consumer exercise their free choice by becoming the ultimate decision makers in the process.

Bucciarelli quotes a colleague as saying;

"Every society gets the technology it deserves." (Bucciarelli, 1994:15)

Bucciarelli clearly agrees with this view when he argues that in order to understand the design process itself, we must remain fully aware of the impact of social context and historical setting in which the design process is

undertaken. User-centred, *co-operative* and *participative* design processes, as advocated by Mumford (1983), Eason (1988), Kawalek & Leonard (1996) and Heron (1996), begin to address these issues, but all stress the need to also remain aware of the dynamic nature of social, political and economic influences.

The *Logical User-Centered Interactive Design Methodology* (LUCID), formerly known as Quality Usability Engineering (QUE) (Kreitzberg, 1996), appears to have been adapted in an attempt to address as many of the concerns arising from consideration of the wider influences and consequences of software development as possible. At the heart of the LUCID methodology is the development of a *high concept*, which defines the goals, functionality, and benefits of the product. In addition, commitment is made to *user-centred design* and *usability engineering* as well as consideration being made for environmental, technical and legal constraints. LUCID's thoroughness in software development focuses on activities, deliverables and reviews through each of the stages.

Shneiderman (1998) identifies twelve areas of activity in LUCID that are evaluated throughout the methodology. He also illustrates how each of these activities are linked to specific deliverables and timely feedback using a review process.

The twelve activities, detailed by Shneiderman are:

1. *Product definition*: high concept for managers and marketers.
2. *Business case*: pricing, expected revenues, return on investment, competition.
3. *Resources*: duration, effort levels, team members, back-up plans.
4. *Physical environment*: ergonomic design, physical installation, communication lines.
5. *Technical environment*: hardware and software for development integration.

6. *Users*: multiple communities for interviews, user testing, marketing.
7. *Functionality*: services provided to users.
8. *Prototype*: early paper prototypes, key screens, running prototypes.
9. *Usability*: set measurable goals, conduct tests, refine interface and goals.
10. *Design guidelines*: modification of existing guidelines, implementation of review process.
11. *Content materials*: identification and acquisition of copyrighted text, audio and video.
12. *Documentation, training and help*: specification, development, and testing paper, video and online versions.

(Shneiderman, 1998:107)

Shneiderman (1998) claims that LUCID is designed particularly to encourage an orderly process and that it contains iterations within each stage as well as predictable progress among stages. He also acknowledges that the reality of software development is often more complex than any theoretical process can predict and therefore proposes that any methodology can only serve project management by providing a starting point.

An interesting attempt to capture the content of user models of computer systems was undertaken by Sasse (1997), in a research study which aimed to contribute to the development of an integrated and applicable body of knowledge on users' models, by providing empirical data that could be applied by designers of computer systems. An exploratory approach was taken to screen user behaviour for any evidence of user's models. The findings, concluded that *constructive interaction scenarios* were most suitable for eliciting users' models, since they were more conducive to users verbalising their thoughts. (Sasse, 1997)

Sasse observed that teaching another person about a system or jointly completing a task with another equally experienced person led to a style of

conversation and body language which indicated that users were more involved in this kind of dialogue and therefore more communicative. Sasse also concluded that *structured scenarios*, which tested users' knowledge, were less timely to undertake than construction interaction scenarios, but yielded less information. Sasse admits however that construction interaction scenarios require high investment in terms of preparation, execution and analysis. She suggests that one answer to this would be that the verbal information elicited on video in the study could have perhaps been supplemented with less time exhaustive descriptions by using diagrammatic representations and drawings. (Sasse, 1997)

Sasse concludes that real users' models do not resemble the organised models conveyed in theoretical literature. She claims that the evidence collected in her study reveals that real users' models provide examples of Norman's (1983) observations, by illustrating the following factors:

- Users' models are incomplete, easily forgotten and not clearly defined.
- Users do not run mental simulations of a system in order to predict the correct action; instead they opt for trial-and-error behaviour.
- Even when users know more effective and efficient processes, they prefer to persist with well-established ones.

(Sasse, 1997)

However, Sasse also concludes that this should not deter the development of conceptual models, as evidence from the study also suggests that the system image has some influence on users' models and helps to formulate an appropriate guiding principle. Sasse argues that:

"...interacting with a system which communicates and reinforces the correct model should help users to get closer to that ideal than leaving them to find one from their own knowledge and experience." (Sasse, 1997:11.2.1)

The evidence in the study led Sasse to further conclude that a well formulated model of a real world task is essential for a user to form an appropriate conceptual model. Sasse argues therefore that it is important to clarify what is already in the mind of the user before any assumptions are made about their understanding of how a task is carried out, or what model of the system is considered relevant. Sasse stresses the importance of *linguistic consistency* between the user, designer and system models that are constructed. Sasse calls for further empirical investigation into actual user models in order to inform the diverging opinions on the structure and content of users' models. She also proposes that it is essential to provide detailed examples of user models for design application. Sasse argues that this is;

"..for the benefit of designers, who, presented with lots of abstract theory and no examples, struggle to see how this theory might be applied to the design process." (Sasse, 1997:11.3.1)

Sasse reports that methods for eliciting and describing users' models still need to be developed, in addition to methods for eliciting users' models of tasks and users' general knowledge and experience. She proposes that these would provide valuable inputs for a conceptual design-based process.

Passini (1999) proposes the concept of *wayfinding*, which he describes as referring to the cognitive and behavioural abilities associated with reaching a desired destination. Passini likens this representation to a cognitive map and distinguishes wayfinding from other problem solving behaviour because it operates in an architectural, urban or geographic space, by constructing a mental representation of a large-scale space. He acknowledges that these cognitive maps are part of information processing and claims that they provide information for both decision making and decision execution in addition to being records of direct environmental perception and cognition. (Passini, 1999)

Passini stresses the distinction between wayfinding in familiar and unfamiliar environments or situations, since executing decisions is a more automatic process than decision making. He also observes that;

"..some users tend to rely more on information of a linear, sequential order that leads them from one point on a route to the next, whereas others are more likely to rely on information of a spatial nature that provides them with an overall picture of the setting. These two wayfinding styles are only partly user-specific; they are also affected by the setting's architectural and spatial characteristics. Most people will rely on a linear sequential style when finding their way in complex underground spaces where cognitive mapping is difficult. This suggests that, as a rule, designers should provide information for both wayfinding styles." (Passini, 1999:89-90)

Screven (1999) also describes how people prefer to learn, receive, organise and implement information in different ways in both formal and informal environments. Screven refers to peoples' preferences as *thinking styles*, a term proposed by Sternberg (1988,1991,1994).

According to Screven, Sternberg separates *thinking styles* into three categories that are constructed around the metaphor of the United States branches of government. These categories or styles are:

- *Legislative style.* Prefers planning and problem solving.
- *Executive style.* Likes to implement and follow established rules.
- *Judicial style.* Prefers judging other and evaluating existing ideas.

Each of Sternberg's main thinking styles are then sub-categorised further into four different ways of thinking that are found within each main style;

- *Monarchic.* Prefers focusing on one need or goal at a time; ignores obstacles.
- *Hierarchical.* Prefers to work with multiple goals with different assigned priorities.
- *Oligarchic.* Works with multiple goals but no priorities. (Therefore goals are often not met.)
- *Anarchic.* Avoids rules, guidelines and regulations, resists authority, employs random approaches and insight rather than working within existing frameworks for solutions. (Screven, 1999)

In educational situations, Screven claims that different thinking styles means that students are likely to process the same message differently and that the design of information or educational systems should therefore give serious consideration to these different styles so that users can approach learning along paths according to their own strategy.

Sanders (1999, 2000) also advocates that *end users* should play an important role in the design process. She also proposes, however, that *all stakeholders* should participate directly in this process, including producers, distributors, sellers and buyers. Sanders argues that the inclusion of all people with a relevant interest in the product or system, leads to design activity that she terms *Collective Generativity* and claims that this is more beneficial than when the design activity is one of *Individual Creativity*. When practiced as an ongoing activity, Sanders defines this 'collective generativity' as *Postdesign*. (Sanders, 1999)

Sanders reports that design firms began experimenting with social science methods in the early 1980s, by bringing social scientists in to aid in the design process. During the 1980s, Sanders, having trained in both psychology and anthropology, began to work as a human factors practitioner or 'user advocate' translating user knowledge into principles that designers could understand and

utilise. Sanders developed specific ways to help products and information systems become more usable. She also studied the way that designers worked and communicated. Sanders reveals that usability is not enough alone. She argues that 'unmet needs' also have to be satisfied in order to make the products and systems useful. In addition, Sanders identified a third user centered factor, that of desirability, and found this a particularly challenging cognitive component to fulfill.

Sanders began to search for new tools and methods of inquiry that were *generative* rather than *evaluative*. After observing designers visually communicating with each other, early on in her study, she developed a set of *Participatory Make Tools* in an attempt to capture people's experiences. *Experience Design* is defined by Sanders as aiming to design users' experience of things, events and places. She argues that knowing about users' experiences is vital to the process of designing communication. Sanders also claims;

"In fact, if we can learn to access people's experiences (past, current and potential), then we can make user experience the source of inspiration and ideation for design. And by making user experience the source of inspiration, we are better able to design for experiencing." (Sanders, 1999:3)

Sanders reports that different ways of accessing experience have evolved over the course of time. *Observational research* was the primary focus of traditional design research methods, and *what people say and think*, particularly through focus groups, interviews and questionnaires, was the focus of traditional market research methods. The new *generative tools*, however, are focused on *what people make*, and Sanders proposes that this provide an environment for people to express their thoughts, feelings and dreams. Sanders argues that when all three approaches are utilised simultaneously, a greater understanding of the people who use products and information systems can be achieved. (Sanders, 1999)

These *Generative Tools* were very recent developments for design process research at the time that this study began. However, they do appear to address some of the issues raised by designers and software developers in the latter decade of the twentieth century. Being primarily *visual*, these tools provide a common ground for communicating thoughts and ideas of people from a wide range of different disciplines and perspectives, providing a design language built upon what Sanders refers to as the *aesthetics of experience* rather than the *aesthetics of form*. (Sanders, 1999) The purpose of *generative research*, which should occur very early in the design process, is to discover unknown, undefined or unanticipated user or consumer needs. Sanders claims that ideas and opportunities arise from the process which often identify or solve unmet user needs.

"Ideas and opportunities generated by users are usually quite relevant and powerful when acted upon and brought to market." (Sanders, 1999:5)

Sanders claims that since the ideas produced by this method are relevant to the users, because they have been generated by them, the end products and systems developed are more useful, usable and desirable. Sanders argues that designers and social scientists need to work together more in the future to develop frameworks for the understanding of user experience and to synthesize and integrate ideas and opportunities. According to Sanders, designers need to learn how to create and construct these new tools and she offers six guidelines that define *Postdesign*:

1. *Postdesign is not about specific methods, tools or processes.* It is about an emerging visual language that people, all people, can use to express and interpret those ideas and feelings that are often so difficult to express in words.
2. *Postdesign is an attitude about people.* It is about the recognition that all people have something to offer and that they, when given the means to express themselves, can be both articulate and creative.

3. *Postdesign is contextual.* Understanding and empathizing with the people who experience artifacts, interfaces, systems and spaces can best be accomplished by communicating with them in the places where they live, work and play *while* they live, work and play.

4. *Postdesign is participatory.* It emphasizes the direct and active participation of all stakeholders in the design development process. This makes the deliverables of design more meaningful to the people who will ultimately benefit from them.

5. *Postdesign is co-design, i.e., people designing together.* It can harness the collective and infinitely expanding set of ideas and opportunities that emerge when all the people who have a stake in the process are invited to “play the game”.

6. *Postdesign is an ongoing process.* People’s needs change and their experiences change. Relationships between people change over time, as well. Postdesign is not a linear process but a continual intersection of changing perspectives. Today it blends design and the arts with the applied social sciences and mixes that blend with new and emerging technologies.
(Sanders, 1999)

Sanders reports that many different types of *Make Toolkits* have been explored and that these tend to fall into two definite categories; *emotional* and *cognitive*. With *emotional* toolkits, Sanders reports that people tend to make artifacts, in the form of diaries or collages, which illustrate or recount stories or dreams. Descriptions of these artifacts by their makers were observed to specifically relate to *feelings*. In the case of *cognitive toolkits*, in contrast, Sanders reports that people make artifacts in the form of cognitive maps, functional 3D models, diagrams showing relationships and process flowcharts. The descriptions of

these by the makers, illustrated how they understood, and importantly, how they misunderstood, things, events and places. (Sanders, 1999, 2000)

The concept of *postdesign* and the practice of researching what people say, do and make, has provided experience that Sanders has proven to be useful for business strategy, marketing and branding. Additionally, Sanders claims that this practice provides inspiration to the design and development process.³

3.1.3 Software Game Design Processes

At the start of this study in November 1999, no published concept design processes could be found that were specific to software game design itself. However the following literature is reviewed to illustrate the theoretical developments particular to the specific arena of study; that is, play in a technological environment.

Malone (1980) offers 'a study of intrinsically motivating computer games', asking 'what makes things fun to learn' and proposing that 'the presence of a goal' is the most important feature in determining individual game preference. Malone organises his theory of intrinsically motivating instruction into three categories; *challenge*, *fantasy* and *curiosity*, concluding that;

"The new technology of computers – with its uniquely rich possibilities for responsive fantasy, captivating sensory effects, and individual adaptability – has an unprecedented potential for creating fascinating educational environments. But as our cultural experience with television indicates, great potential does not guarantee wise use. I have tried to point the way, in this report, toward a humane and productive use of this new educational technology that avoids the dangers of soulless drudgery on the one hand and mind-numbing entertainment on the other. "

(Malone, 1980:82)

Malone's taxonomy is interesting as it offers potential guidance for the classification of different kinds of games. He stresses the importance of a game having a 'goal' or that;

"In a sense, the very notion of 'game' implies that there is an 'object of the game'." (Malone, 1980:50)

The European Game Developers Conference (GDC Europe) 2001, revealed what appeared to be one of the first discussions of possible formal methods in this relatively young and developing industry. At this conference, Carter (2001) presents a case for what is termed an *Organic Development Process*. This process will be detailed later in this section, but first a review of the discussion and game development processes identified in the presentation, giving examples of processes already being utilised in the software game industry at that time. Carter (2001) defines a development process as being about scheduling and planning, management, documentation and communication. Carter also identifies that original titles for software games had a track record for being what is termed 'chaotic development'. He stresses that publishers prefer rigid development plans and therefore identifies the need for methods of managing original title development. Carter argues that a development process does provide advantages such as; game quality; staying on track; team confidence and importantly, better developer / publisher relationships. The final point is an important one, since the trend in the leisure software industry has been that without a development process, developers can not attract the support of a publishing contract for their software.

Carter identifies the traditional classic software engineering *Waterfall Method* (see section 3.1.2, earlier in this chapter) as one of the few processes available in the early days of game design. This however, is not how Carter describes the way that developers really worked (in his experience). Instead he describes the *chaotic development process* as being quite common in practice:

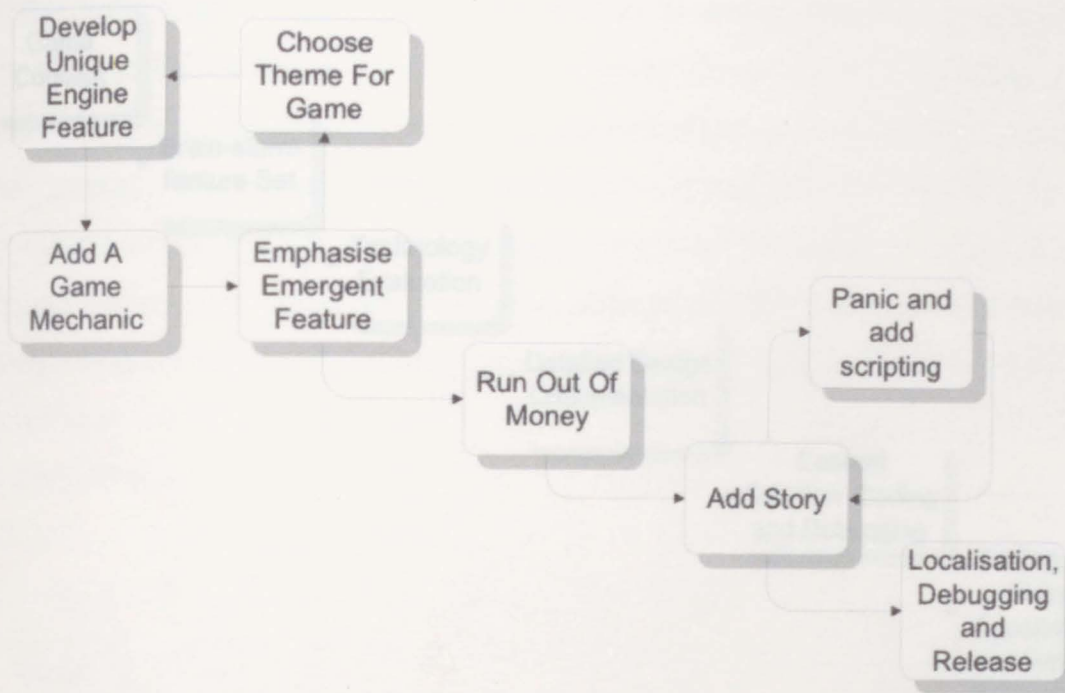
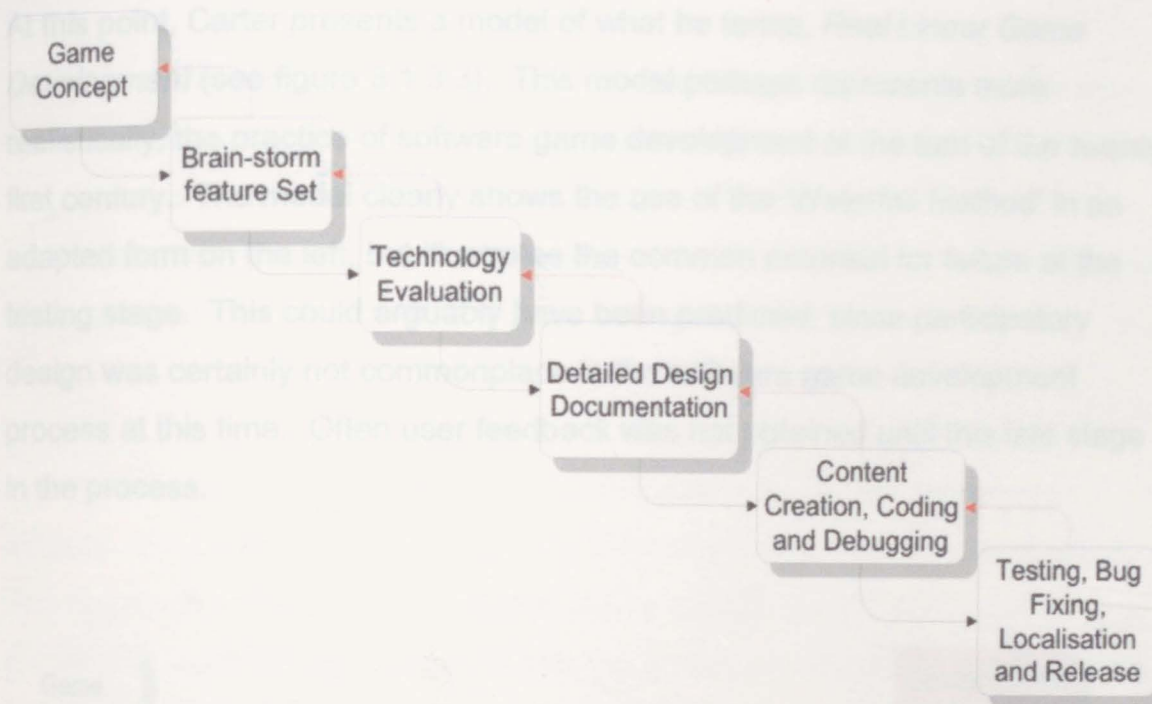


Figure 3.1.3.1 The Chaotic Development Process (Carter, 2001)

Carter reports that the development teams who practiced this method were much smaller, usually made up of around ten people, had much smaller budgets and worked in a less risky industry. The *chaotic process* did however have advantages; according to Carter (2001) it had iterative development built into the process and it did encourage innovation. However, Carter also stresses that it had a definite lack of controls, provided no means to schedule content creation and that it was highly inefficient. The rise of power of the publishers in the software game industry, meant that developers increasingly had to comply with their views, opinions and procedural constraints in order to gain access to the potential large budgets provided for development by publishing companies. By this time, the development of software games was much more risky and Carter reports a tendency to copy the structure of large film production in Hollywood. Carter identifies a *Publisher Driven Process*, which although more detailed in content specific to software games, resembles the *Waterfall Method* closely in its linear 'cascading' structure:

- Provides no effective self-regulation
- Promotes an illusion of security



Based on diagram in: "Rapid Development" (Steve McConnell, Microsoft Press, 1996)

Figure 3.1.3.2 Publisher Driven Process (Carter, 2001)

The advantages, for developers, of using the *Publisher Driven Process*, was that it could help to pre-empt difficulties in development in addition to providing a framework for scheduling different aspects of content development. This meant that publishers could feel more secure in the knowledge that the project would stay on track for a specific release date, or to keep within budget. If there were problems these would be identified before progress or development proceeded too far. The disadvantages of this process however, perhaps have more serious consequences than initially envisaged. Carter (2001) argues that this process has a number of negative aspects, since he claims it:

- Assumes that the original concept is fun.
- Stifles innovation.
- Works best for simple/evolutionary designs – not 'original' games.
- Assumes all risk can be predetermined.
- Provides no iterative self-regulation.
- Promotes an artificial sense of security.

At this point, Carter presents a model of what he terms, *Real Linear Game Development* (see figure 3.1.3.3). This model perhaps represents more realistically, the practice of software game development at the turn of the twenty first century. The model clearly shows the use of the 'Waterfall Method' in an adapted form on the left, but illustrates the common potential for failure at the testing stage. This could arguably have been predicted, since participatory design was certainly not commonplace in the software game development process at this time. Often user feedback was not obtained until this late stage in the process.

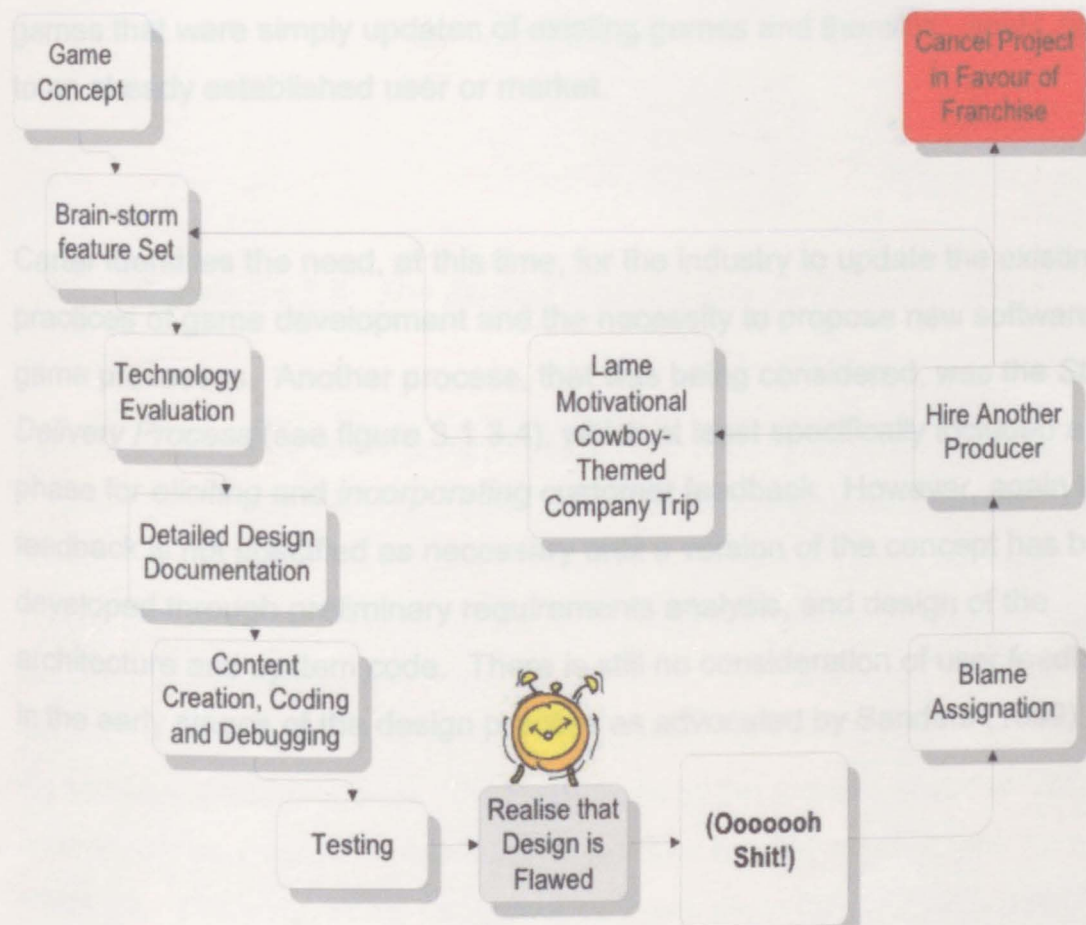


Figure 3.1.3.3 *The Real Linear Game Development Process (Carter, 2001)*

Software game design at this time was still evolving itself, and Carter identifies, in the model, common remedies for the problems that arose out of the testing stage. These usually comprised of changing the producer or management of the project, or more radically the option of canceling the development of original title projects, in favour of franchise titles that were felt to be less risky.

Franchise titles have become very common in the leisure software game industry, since they are usually based on tried and tested market interest areas. This approach to development perpetuated a prolific rise in the amount of 'new' games that were simply updates of existing games and therefore would appeal to an already established user or market.

Carter identifies the need, at this time, for the industry to update the existing practices of game development and the necessity to propose new software game processes. Another process, that was being considered, was the *Staged Delivery Process* (see figure 3.1.3.4), which at least specifically included a phase for *eliciting* and *incorporating* customer feedback. However, again this feedback is not specified as necessary until a version of the concept has been developed through preliminary requirements analysis, and design of the architecture and system code. There is still no consideration of user feedback in the early stages of the design process as advocated by Sanders (1999)

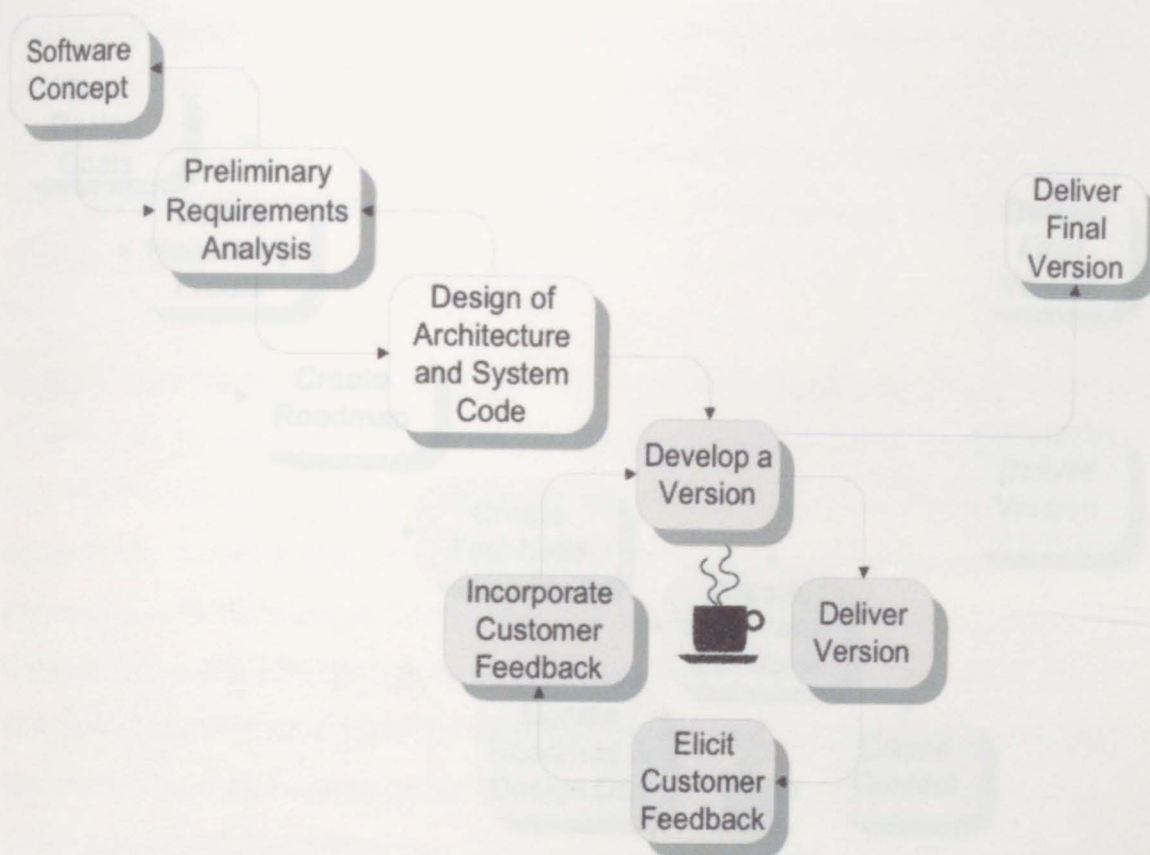


Figure 3.1.3.4 The Staged Delivery Process (Carter, 2001)

Carter's proposal for an *Organic Development Process* (2001) (see figure 3.1.3.5) attempts to address the issues of *Pre-planning*, *Test-Beds* and *Iterative Development*. In pre-planning, clear design goals are adopted, necessary 'proofs' are defined in relation to the technology and the fundamental game mechanics, and additionally a *roadmap* of the project is created. Also, a *minimal design document* is detailed containing key features and mechanics of the software game proposal. The next phase of the process specifies that *Test-beds* should be created. Essentially, a *test-bed* is really another term for a prototype. However, in the context of software game development, a *test-bed* can create a short-term milestone on the agreed *roadmap* towards a bigger conceptual final version. The test-bed provides an iterative cycle within the design process, for which creative content is developed and a *version* of the initial concept is delivered and evaluated, usually with *testers*, before development and delivery of the final version takes place.

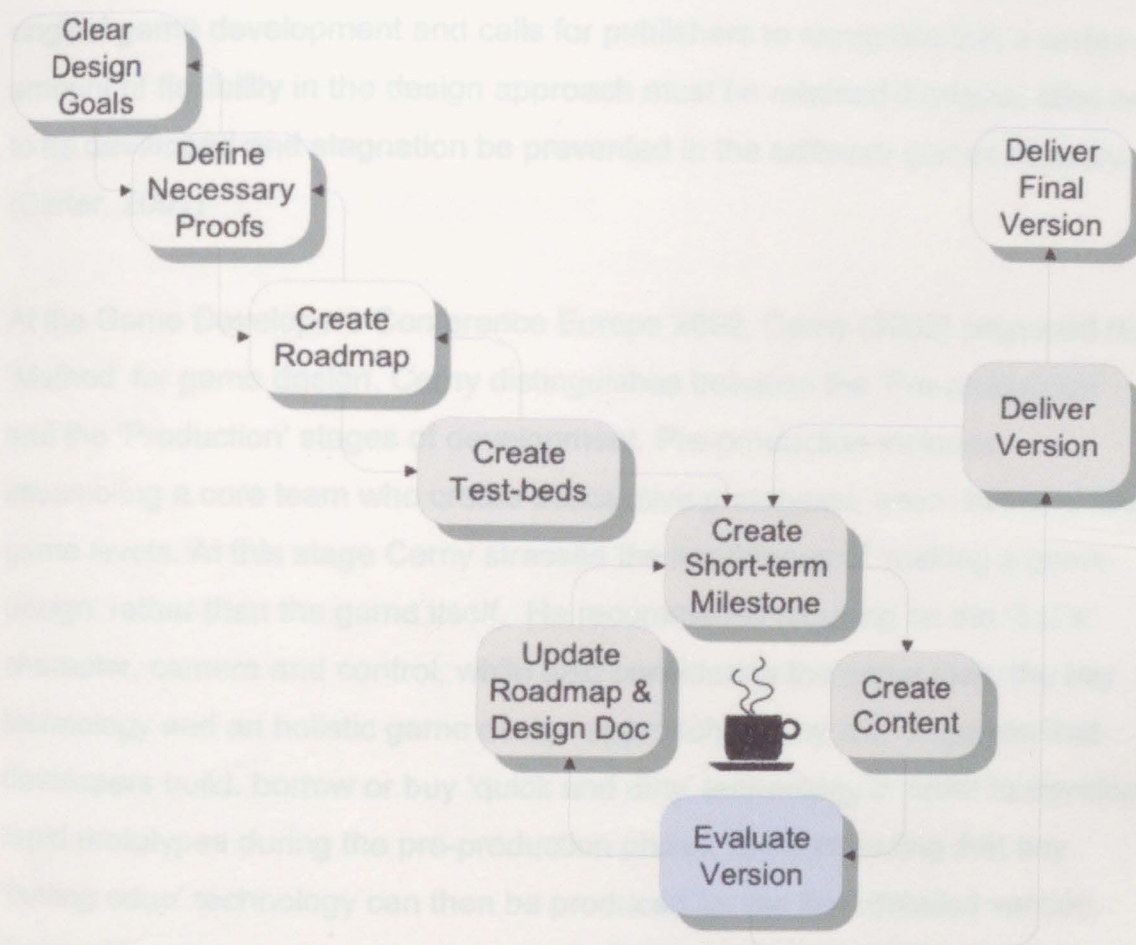


Figure 3.1.3.5 The Organic Development Process (Carter, 2001)

It should be noted that *testers of versions* are usually paid by the development or publishing company and are often made up of individuals who have an interest in entering the software game industry, since this is one of the employment routes into these highly competitive business environments. However, *test-beds* at least allow for iteration to take place within the process, although again, with this process the position of this feedback is in conflict with Sanders (1999) recommendations for involving real stakeholders and users early on in the process, preferably at the concept development stage. Carter, stresses that the *Organic Development Process* provides efficient ways to manage risk and allows for 'controlled innovation', however he recognises that the burden of project management is larger throughout the project and that discipline is required to maintain focus. Carter concedes that this is perhaps not

the best process for well-defined designs, but that it is a method that allows for original game development and calls for publishers to recognise that a certain amount of flexibility in the design approach must be retained if original titles are to be developed and stagnation be prevented in the software games industry. (Carter, 2001)

At the Game Developers Conference Europe 2002, Cerny (2002) proposed his 'Method' for game design. Cerny distinguishes between the 'Pre-production' and the 'Production' stages of development. Pre-production includes assembling a core team who create successive prototypes, which become like game levels. At this stage Cerny stresses the importance of 'making a game design' rather than the game itself. He recommends focusing on the '3 C's'; character, camera and control, while also considering the game look, the key technology and an holistic game design approach. Cerny also suggests that developers build, borrow or buy 'quick and dirty' technology in order to develop rapid prototypes during the pre-production phase, recommending that any 'cutting edge' technology can then be produced for the final detailed version. Cerny recommends that a 'publishable first playable' and a 'macro game design' be delivered at the end of pre-production. According to Cerny, this 'first playable' should contain two levels, all local and global features as far as possible, and be of publishable quality. The following is a more detailed checklist of what features Cerny recommends should be achieved during this first playable, pre-production phase:

- 1 Player behaviour fully defined
- 2 Basic technology done
- 3 Enemy / obstacle behavior fully defined
- 4 Art direction in place
- 5 All local features included, global features included as required
- 6 A touch of variety
- 7 Scope of game defined

(Cerny, 2002)

Cerny also details what should be contained in the 'macro design';

1. five pages
2. character and moveset
3. exotic mechanics
4. level structure, size and count
5. level contents
6. overarching structure – linear, hub
7. a macro chart

Cerny's macro chart contains details of what each level will look like, its locale, structure, gameplay and what rewards are necessary for entry and exit of the level. Cerny argues that macro design provides the benefit of accurately scheduling production, tracking progress during production, preventing 'feature creep' and 'feature drop', and that it properly 'circumscribes creativity'. (Cerny, 2002) Cerny also adds some extras to the macro design list; a brief story, conceptual art, and the acquired abilities or inventory of the game.

Cerny's checklist for the 'micro design' phase, includes;

1. script
2. level maps
3. enemy description, behaviors
4. puzzle descriptions
5. special gameplay descriptions
6. and much more.

(Cerny, 2002)

Cerny does not appear to be keen on focus group testing. He criticises them for providing little information other than what people have liked from recent popular games and suggests that listening to focus group are a waste of time. He does however recommend 'gameplay testing', which he suggests should be carried out two to five times during the production phase, watching what they do and carrying out quantitative analysis of the results. (Cerny, 2002)

3.2 Comment on Design Methods and Processes

Unfortunately, none of the processes identified in the literature review revealed any methods specific to the generation of *concept* ideas for interactive play. This gap in the literature clarifies the need for further design processes to be developed that will assist and guide designers in this industry. Concept generation is an important starting point for all of the processes that have been identified; yet none of the methods detail how to arrive at a concept idea specific to an interactive digital media environment.

The software game design processes that were reviewed (Malone, 1980; Carter, 2001 and Cerny, 2002) all make reference to a concept idea, but provided no detailed methods (other than the options of franchise or insight) for how these concepts could be generated by designers. Malone perhaps comes closest in at least identifying a possible taxonomy of play in terms of challenge, fantasy and curiosity. (Malone, 1980)

Market research⁴ undertaken by publishing and development companies was also found to be of limited use, since it was often based on information restricted to a particular level of computer or to information only on products already in existence. Few attempts were being made, at the time of this study, to understand what existing or potential users might want from software games, since most leisure software product development was being based on the assumption that users simply wanted more of what they had already been given.

Since this study was primarily aimed at designing leisure software concepts for a potential user group, the established methods derived from technology and software engineering (section 3.1.2) were also not considered to be specifically useful. There is little doubt however, that they provide a more general reference for the overall management of software game development projects within an

industrial manufacturing context. Preece's (1994) reiteration of the importance of mental models should however be noted, as should some of the general design methods and processes reviewed in section 3.1.1. The general design guidelines proposed by Jones, 1970; Schön, 1983; Norman, 1988 and Stoll, 1999 are particularly considered to be relevant.

Given the lack of concept generation techniques specific to interactive play identified in the literature review, the approach recommended by Sasse (1997), in investigating real user models of technology was considered to be one of the most useful for identifying factors or representations associated with interactive play for potential users. Passini's (1999) concept of 'wayfinding' and cognitive maps that provide information for both decision making and decision execution, was also considered relevant particularly since it reiterates Tolman's (1948) psychological theory of cognitive mapping detailed in chapter 2 of this thesis.

The *generative tools*, proposed by Sanders (1999) did provide, and detail, a useful approach for accessing *latent* needs or desires of users, that could be adapted to the context of inclusive interactive digital media. Efforts were made therefore, to integrate the approaches of both Sasse (1997) and Sanders (1999) in the development of the *Concept Generation Technique* specific to interactive play, detailed in the next chapter. The approach taken in the following chapter on fieldwork also draws on the psychological literature reviewed in chapter 2, in an attempt to apply the relevant theories of motivation with regard to play, learning and social development.

¹ Electronic Arts Inc. Chertsey, UK

² Argonaut Games plc. Middlesex, UK.

³ See the SonicRim website: www.sonicrim.com

⁴ A market segmentation analysis carried out by Continental Research in March 1999 for Electronic Arts.

4 Fieldwork:

Accessing Potential Users

4.1 Fieldwork Aims and Objectives

A study of leisure software interests for females aged 13-19.

In the autumn of 1999, the largest global software game publishing company¹ initiated a policy, which identified the following objectives:

- to explore a 'games for all' philosophy
- to develop new products for a wider demographic

It was agreed therefore that a year long research and development programme would be undertaken by fieldwork, in order to clarify and resolve concerns that had arisen in a market segmentation study² of PC users. This study had indicated considerably fewer sales of leisure software games amongst teenage girls when compared with boys of a similar age and with girls in the 5-12 age bracket just below. This market segmentation study however only considered sales of games for PCs of a certain specification and above. It was therefore decided early on in the research method, that in order for the fieldwork to produce more general results, it would need to address all leisure software products across all of the available game formats at the time of the study.

The publisher recognised that the leisure software industry was dominated by games and products that had a strong male orientation. Only a few companies were attempting to design products with a more balanced specification to attract both male and female users but these were tending to focus on the younger children's educational and gaming market. Some attempts had been made to

address so called 'games for girls', but these had appealed more to the 5-12 age group and had produced little apparent affect on software sales to teenage girls. The publisher did not feel that the teenage female market segment had to date been comprehensively investigated. This was a potential new group of users and the publisher was keen to develop new products for a wider demographic.

The publisher's philosophy for leisure software was that "games are for everyone" and they were determined to find ways to broaden their user population and make 'gaming' accessible to all, including teenage girls. They wanted to know whether it was true that these girls were not buying software games and if not, why not? Were they interested in leisure software or not? If they were interested, what would they want to buy?

The publisher's UK Managing Director along with their UK Marketing Director and a senior executive from the publisher's development studios were very keen that the reasons behind the market differences be investigated. They were specifically looking for a research and development programme that was not prejudiced by any substantial knowledge of the games industry and that could not only research the field, but also provide product concept designs and solutions that would begin to address wider user participation in an applied environment.

The initial year of this study therefore investigated, through primary fieldwork, a representative section of the UK female market, aged between 13-19 years old, during the period November 1999 to September 2000. The main aim of the investigation was to study the attitude and behaviour of these girls towards leisure software. The project was to be divided into the following programme of work:

- To design and specify a range of concept products which would meet the expectancy and interests of the specified group.

Stage 1 - Market Research Study:

Detailed user research was to be undertaken to establish the attitudes and behaviour of the specified segment towards existing leisure software products. This research was to consist of a series of individual and collective focus group sessions and observations of the user's reaction to a range of leisure software products. Also the study was intended to define the user characteristics, product perceptions and attitudes to leisure software that would affect the users preferences within potential leisure software products.

Stage 2 - User Behaviour Study:

This proposed the examination of the specific user segment's reaction to individual features, which would possibly affect purchasing decisions and brand loyalty towards product types. It would also include an evaluation of potential product features versus user reaction with a comparative assessment of current traditional leisure products and brand advertising.

This study was intended to define the key drivers of the specified market segment and the key factors for product development within that group.

Stage 3 - Product Development Proposals:

Based on the market research and user studies a range of concept designs were to be developed and presented in storyboard and scenario form. These concepts were to be evaluated with the focus groups.

In summary - Fieldwork aims and objectives

- To identify the consumer attitudes and behaviour of the female market segment aged 13-19 towards leisure software.
- To study the key interests and features of potential products which would affect purchasing decisions of this user group.
- To design and specify a range of concept products which would meet the expectancy and interests of the specified group.

4.2 Initial Fieldwork Observations

As indicated in the introductory chapter of this study, it was vitally important for the literature review in each area to be ongoing throughout. It was also necessary to keep abreast of developments through the Internet, trade magazines and press articles associated with leisure software and games, since these were the places where most recent developments were published. It was essential to establish what games, gaming equipment and development methods were available at the start of the investigation and also to be aware of those that emerged during the time of the study. It was also important to note national and international media attention and presentation of the phenomena under investigation since these factors potentially would affect societal reaction to leisure software.

At the beginning of this study, leisure software as a product was generating large sales in a rapidly growing market. However, as discussed in chapter 1, most of the market involved a demographic consisting of predominantly 16-35 year old males. Figures for 1995 report that for the USA, 75-85% of the sales and revenues generated by the, at that time, \$10 billion US game industry, were derived from male consumers. (Cassell & Jenkins, 1998)

This demographic had developed during the early days of the leisure software industry which, when compared with that of more established industries may be considered short and in its infancy. Just a glance across the last fifty years, however, reveals a complex and vast catalogue of events and innovations that have affected far-reaching influences not only directly to the software industry, but also to many other areas of human culture and social activity and inheritance.

Beginning in specialist research departments of universities in the 1950s and developing throughout the last half of the twentieth century until the present

day, the leisure software industry has encompassed enterprising one-person ventures in addition to the emergence of more structured development processes within both small and large development studios and publishing companies.

The large global publishing companies have come to dominate the market and the direction of leisure software. Development studios have had to submit to the demands of publishers in order to get their products the exposure needed to cover development costs. Initially games were often designed in bedroom studios and released to only a minority, but as popularity grew and technology developed, clusters of creative individuals and bigger teams began to emerge and organise themselves into development studios.

Chapter 3: The Design Process, details how the emergent development studios have begun to make use of traditional product development cycles and methods taken from science based software development processes. As identified in the discussion in chapter 3 of design methods particular to software development, all of these processes begin after the concept for the game or software has been decided.

Primary fieldwork observations and discussions with the large publishing company³ (who also owned several development studios) and at a separate medium sized development studio⁴, revealed that concept generation was usually driven by:

- Market research defining what is already bought and by whom
- Licenses owned and controlled by copyright
- Occasional original ideas from individuals

One of the main objectives of the fieldwork in this study was that concepts should be developed that would be appealing to the specified target user group.

In order for these concepts to emerge it would therefore be necessary to establish a concept generation technique that could identify the attributes of leisure software that would appeal to the target group.

Since the literature review and the primary fieldwork with the publisher and the development studios revealed no concept generation techniques specific to leisure software, it was necessary to develop a method that would serve this purpose for the study with the focus groups from the target population.

In order therefore to involve stakeholders at all levels of the design process it was decided that getting feedback directly from the girls within the specified age group was imperative as early on into the programme as possible. The approach adopted for this was through questionnaire and focus group studies and it was decided that some of the local secondary schools would provide an environment for this. Before the schools were contacted, it was necessary to establish a clear understanding of the questions that were to be raised in order to extract the girl's real interests and attitudes towards leisure software. It was possible that some of the participants would already have been influenced by existing products, thus the need to be familiar with these, while retaining an open mind to explore the potential interests for development of products that might boost interest from female teenagers.

Surveying the existing game products began in November 1999. At this stage, with a limited knowledge of the games industry, just one day out in a city centre proved to be an eye opening experience. This was big business. Children and adults (mostly male) were very enthusiastic about 'gaming'. At that time the Dreamcast console had just been released so there was major interest in its performance and software availability. There was a constant group around the Dreamcast display, where 'Ready to Rumble', a heavy duty boxing game, was featuring. Everywhere there were games to try. However, it could clearly be observed that almost every game fell into a few category headings, which were used in the shop displays; *fighting, driving, flight simulation, war simulation,*

sports or gothic style role play. They all looked interesting in their own different ways, but a definite dominance of masculinity and aggression was observed in the promotional content and presentation. Little material was available in the game stores that appeared to be directed at a wider range of users and only a few that might have a more feminine appeal. There were a few obvious 'girls' games like *The Ultimate Girls Collection 5*⁵ which contained a selection of four games: *Barbie Ocean Discovery*⁶, *My Little Pony*⁷, *My Secret Diary*⁸ and *Starshot*⁹. These games were clearly aimed at the 5-12 age group and contained graphics that portrayed cute characters with a tendency towards bright pink! They had little content or style that would obviously appeal to a teenage girl since both the game concepts and the presentation of imagery were clearly too young for a more mature range of interests. There were games like *Chocobo racing*¹⁰, a cute (sometimes) cartoon style car racing game, which had a similar graphic style to *Croc-The Legend of the Gobbos*¹¹ and *Spyro*¹² a little cartoon dragon that explored and collected gems (a common pastime in many software games). These looked as though there may be a potential appeal, so they were noted in order to add them to a list of games that needed to be established in order to test the reactions of the focus groups. Then there were the 'theme' games; *Theme Park*¹³, *Theme Park World*¹⁴, *Theme Hospital*¹⁵ and the 'Sim' games like *Populus*¹⁶ and *Sim City*¹⁷. These had proved popular, according to official UK charts¹⁸ and they did seem to indicate, through their graphical and content style, a more general potential appeal than the core genre games that were the rage with the hardcore gamers.

This 'virtual' shopping trip quickly revealed that it would be necessary to offer a range of the products available to the focus groups that would cross all the genres and leave them to choose their own preferences and observe any reactions. A list of 30 games was drawn up that ranged across the different genres already in existence. These would be tested in a game play observation session with the focus groups, detailed in section 4.5.5 of this chapter. The list of games tested are detailed in Appendix 2.1, the results are also fully detailed in Appendix 2.3 and summarised in section 4.9, later in this chapter.

4.3 Plan of primary fieldwork

A plan of approach was devised for the task of observing the user group's attitudes and behaviour. Initial plans took the form of the following diagram:

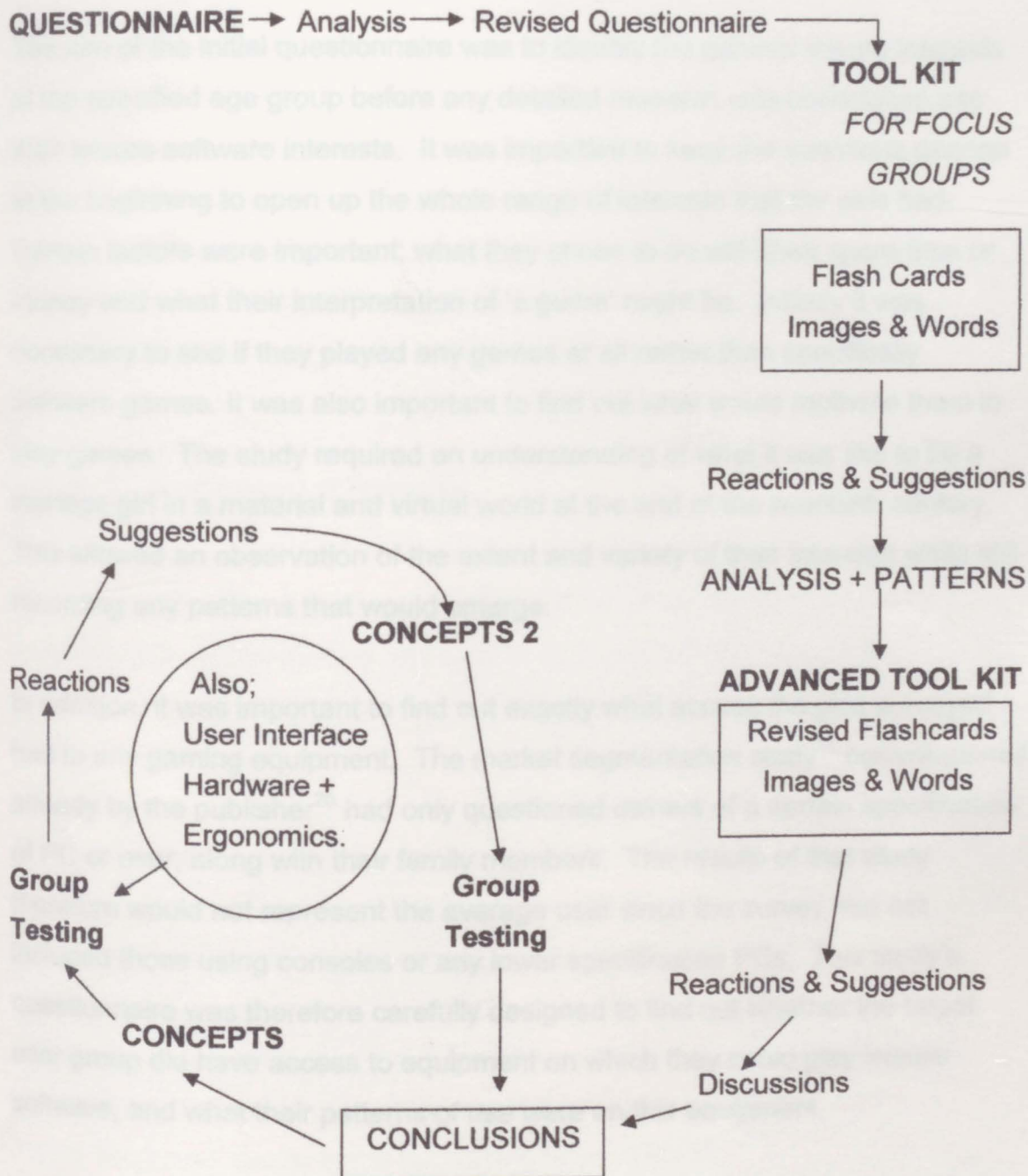


Figure 4.3 Plan of Primary Fieldwork

4.4 Stage 1: Market Research Study

4.4.1 Questionnaire Development

The aim of the initial questionnaire was to identify the general leisure interests of the specified age group before any detailed research was undertaken into their leisure software interests. It was important to keep the questions general at the beginning to open up the whole range of interests that the girls had. Certain factors were important; what they chose to do with their spare time or money and what their interpretation of 'a game' might be. Initially it was necessary to see if they played any games at all rather than specifically software games. It was also important to find out what would motivate them to play games. The study required an understanding of what it was like to be a teenage girl in a material and virtual world at the end of the twentieth century. This allowed an observation of the extent and variety of their interests while still recording any patterns that would emerge.

In addition, it was important to find out exactly what access the girls surveyed had to any gaming equipment. The market segmentation study¹⁹ commissioned already by the publisher²⁰ had only questioned owners of a certain specification of PC or over, along with their family members. The results of that study therefore would not represent the average user since the survey had not included those using consoles or any lower specification PCs. This study's questionnaire was therefore carefully designed to find out whether the target user group did have access to equipment on which they could play leisure software, and what their patterns of use were on this equipment.

The market segmentation study had indicated that the **sales** of leisure software to this age group of girls were substantially behind sales to boys of a similar age and younger girls. The initial task was to find out why that was so, and what

they did spend their money on. Additionally, the questionnaire covered general lifestyle issues which it was felt would not only assist in determining where the girls' interests lay, but would also help to point out useful marketing opportunities. The questionnaire also asked about play preferences and motivation during play.

The pilot questionnaire was circulated to 24 girls aged 16-19 years who were Foundation and Further Education students at an Institute of Art and Design. The answers were reviewed with interest and a few minor adjustments were made to make some of the questions clearer. The final questionnaire (see Appendix 1.1) was distributed in January 2000 to an additional 246 girls ranging from 13-19 years of age at three different secondary schools in North Kent. In total 270 completed responses were collected and analysed.

4.4.2 Questionnaire Results

The full results of the questionnaire stage of the study are recorded in detail in Appendix 1.2. While plotting and recording responses, several results contrasted with those from the market segmentation study carried out earlier on the publisher's behalf.

As the initial questions related to games in general and not specifically to leisure software products, the respondents' answers therefore ranged across all games including those that did not involve any technology at all.

The most striking initial result was that the girls clearly were playing leisure software products and some quite regularly.

This is illustrated clearly in the responses to question 6;

What games do you play?

Answers were:

Computer games	25.6%
Sports	22.2%
Board games	17.6%
Playstation games	17.4%
Card games	5.9%
Nintendo 64	3.8%
Traditional	2.9%
Gameboy	1.9%
Sega console	1.3%
Dreamcast console	0.8%
Children's games	0.4%
Mobile phone games	0.2%

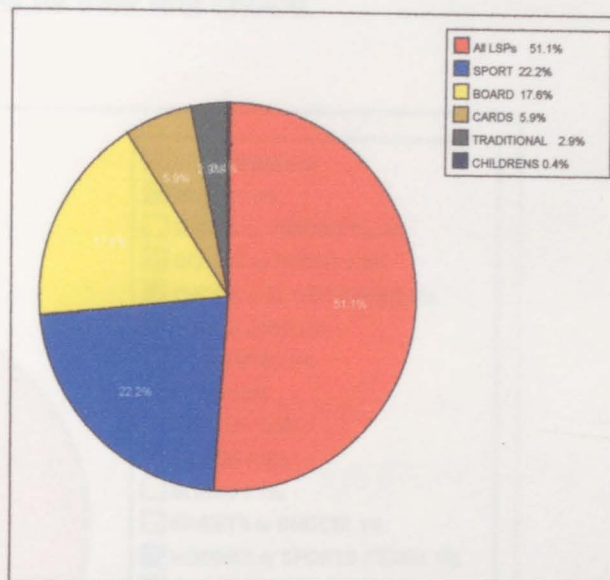


Figure 4.4.2.1 Questionnaire Result (Females 13-19)
What games do you play?

'Traditional games' were interpreted as things like skipping, hide and seek and spin the bottle. 'Children's' games were given as the answer by a few respondents and described as things they played with younger siblings, for example with dolls or other toys.

Given that the list contained several methods of playing software games, those that are highlighted in bold were totaled to produce a figure which represented the overall percentage of girls in the survey that were already playing leisure software products. This gave a total of just over 50% playing Leisure Software Products across all platforms.

Another key result observed was from question 4; that the top choice for what to buy with £30 was clothes. The figure of £30 had been deliberately set in the knowledge that it was the average price for a software game at that time.

Clothes received 62.6% of the votes, clearly indicating that these girls had a

long list of things that were prioritised above buying software games. In fact only 2 respondents, a mere 0.7%, listed buying software games as an option, citing Playstation or Gameboy games as their first choice.

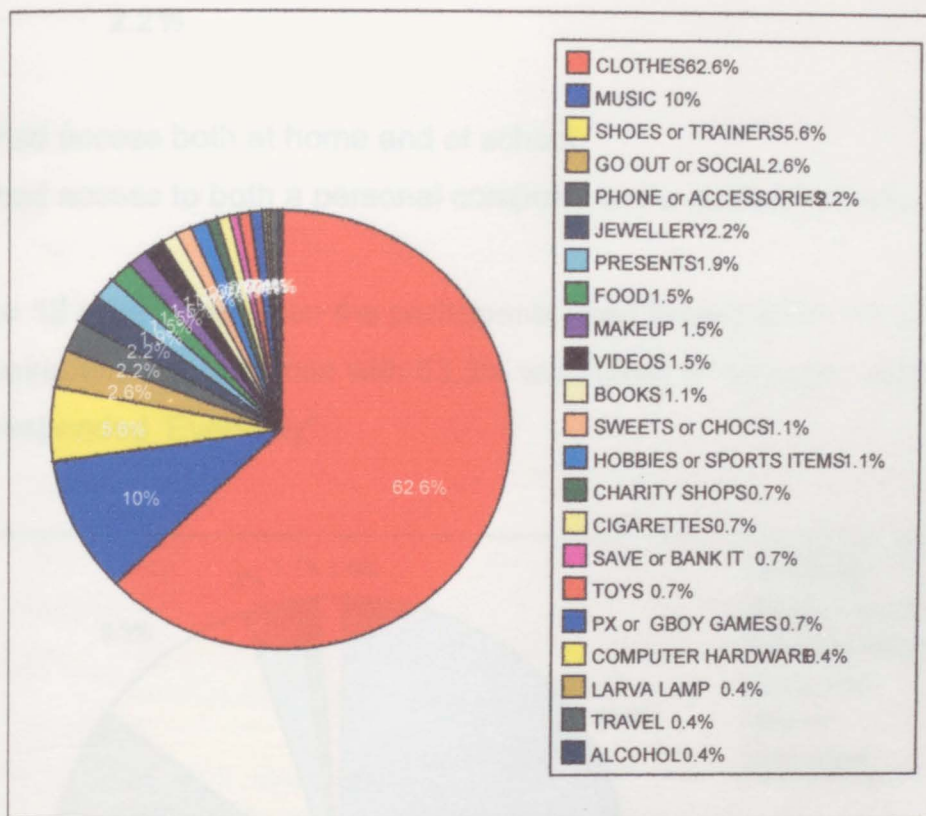


Figure 4.4.2.2 Questionnaire Result (Females aged 13-19)
What would you buy with £30.00?

The £30 question confirmed the results of the market segmentation study initially commissioned by the publisher; that girls in this age group **did not** buy software games as a top priority. Analysis of the questionnaire data, however, showed that girls were still playing these games, and at a greater frequency than had been expected.

As previously noted, it was important to establish via the questionnaire how much access those surveyed had to personal computers or game consoles. Question 10 gives a clear indication of the scale of use in the potential user group.

When asked;

Do you have access to a personal computer or games console?

The overwhelming response was:

Yes 97.8%

No 2.2%

55.9% had access both at home and at school.

56.3% had access to both a personal computer *and* a games console.

Question 12 asked how often the participants used the equipment to which they had access. The top response with 53.3% was 'Once or twice per week' and 31.9% responded 'Everyday'.

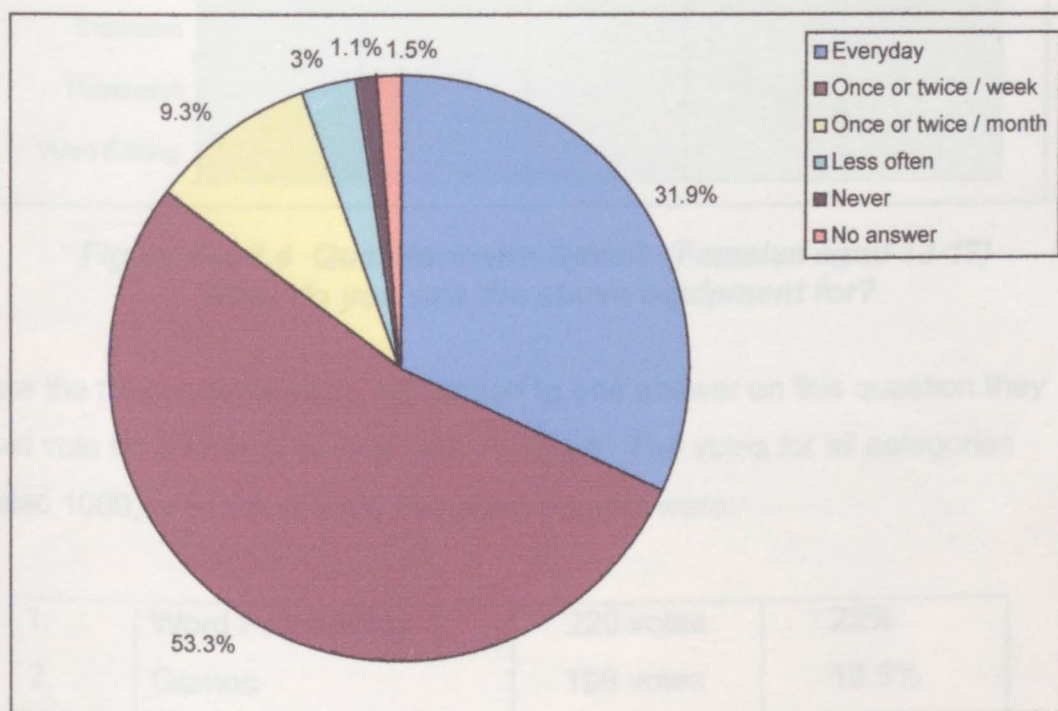


Figure 4.4.2.3 Questionnaire Result (Females aged 13-19)
How often do you use the PC or games console you have access to?

The most informative answer on this topic was the response to question 12a; *What do you use the above equipment for?* This gave a result that confirmed that the girls were playing leisure software. The responses showed a clear lead in three areas.

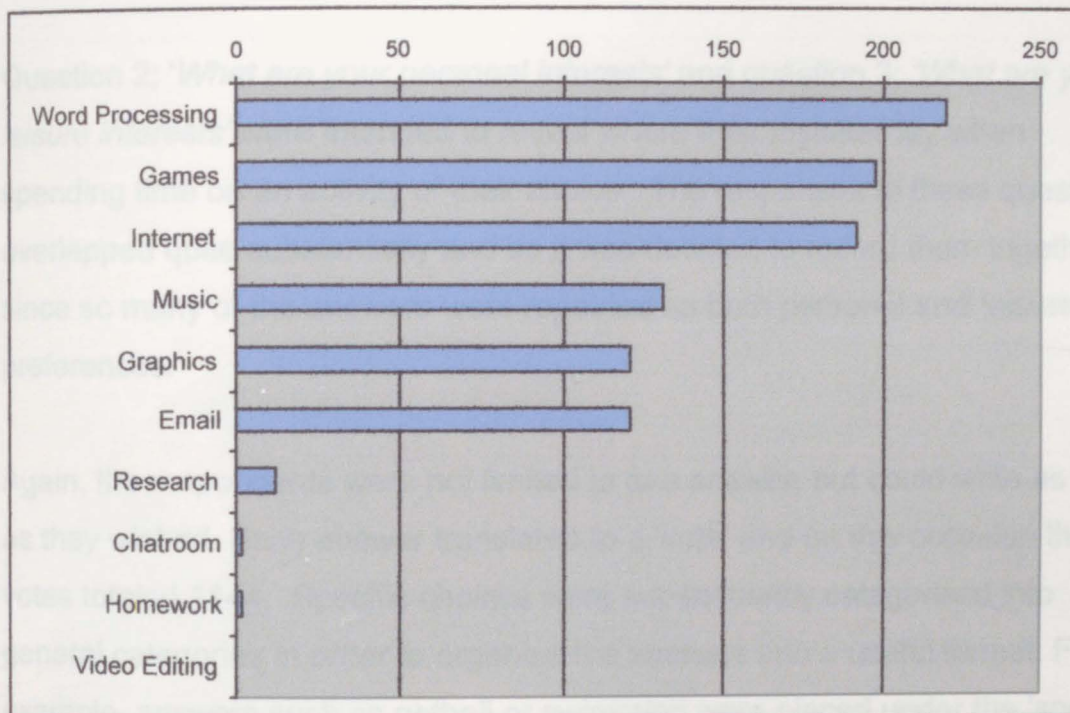


Figure 4.4.2.4 Questionnaire Result (Females aged 13-19)
What do you use the above equipment for?

Since the respondents were not limited to one answer on this question they could vote for as many uses as they wanted. The votes for all categories totaled 1000, of which the top five most popular were:

1.	Word Processing	220 votes	22%
2.	Games	198 votes	19.8%
3.	Internet	192 votes	19.2%
4.	Music	131 votes	13.1%
5.	Graphics	121 votes	12.1%
	E-Mail	121 votes	12.1%

Table 4.4.2.1 Top five most popular uses of technology equipment
(Females aged 13-19)

These results gave valuable information with which to plan the next stage of the research project, the focus groups. It had been established that the girls did have an existing interest in software games, but it was still necessary to discover what features would affect their purchasing decisions.

Question 2; '*What are your personal interests*' and question 3; '*What are your leisure interests*' were intended to reveal where their loyalties lay when spending time on an activity of their choice. The responses to these questions overlapped quite substantially and so it was decided to record them together since so many of the answers were repeated as both personal **and** leisure preferences.

Again, the respondents were not limited to one answer, but could write as many as they wished. Each answer translated to a 'vote' and on this occasion the votes totaled 1144. Specific choices were subsequently categorised into general categories in order to organise the answers into a useful format. For example, answers such as netball or swimming were placed under the 'sport and keep fit' heading, particularly since there were so many sport options identified.

The top five general leisure and personal interests that emerged from the questionnaire data for this target user group were:

1.	Sport + Keep Fit	204 votes	17.8%
2.	Social + Phone	126 votes	11.0%
3.	Music	123 votes	10.7%
4.	Shopping	103 votes	9.0%
5.	Television	94 votes	8.2%

**Table 4.4.2.2 Top five general Leisure & Personal Interests
(Females aged 13-19)**

The full range of responses of the potential target user group of females aged 13-19 for personal and leisure interests are detailed in figure 4.4.2.5 below.

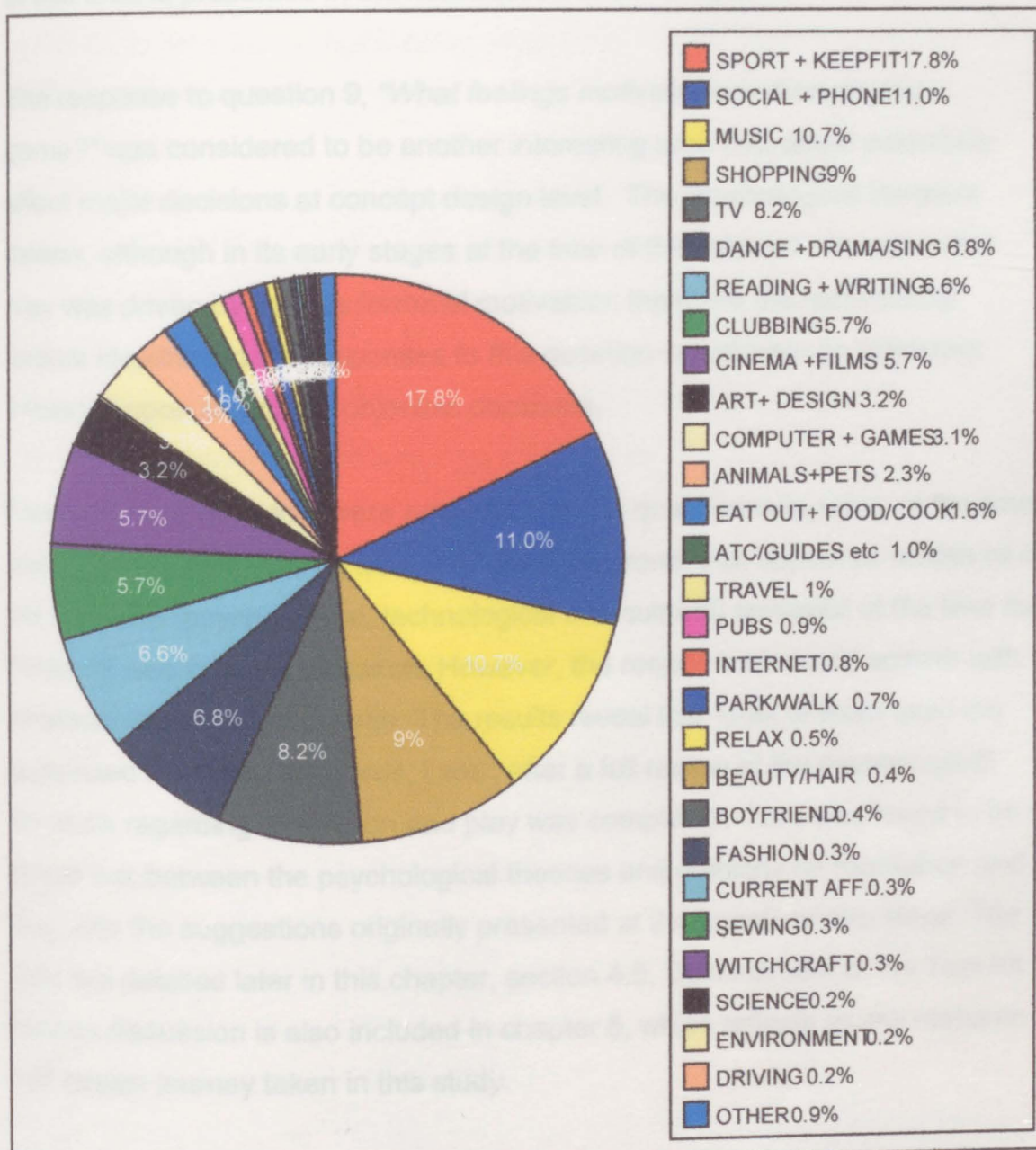


Figure 4.4.2.5 Questionnaire Result (Females aged 13-19)
Personal and Leisure Interests

Question 8, addressing the group's *social play preferences*, produced a result which indicated that most respondents preferred double, partnered or group play rather than solitary play. This would potentially affect the kind of games that might be proposed at the design stage of the development. Further analysis of this area is presented in the next section of this chapter.

The response to question 9, "*What feelings motivate you when playing a game?*" was considered to be another interesting area that would potentially affect major decisions at concept design level. The psychological literature review, although in its early stages at the time of the fieldwork, revealed that play was driven by various forms of motivation; therefore the motivational factors identified in the responses to this question would have an important influence upon any game objective decisions.

Example responses that were presented on the questionnaire were, at the time, merely suggestions drawn from a range of keywords that appeared across all of the literature (psychological, technological and cultural) reviewed at the time the fieldwork was being undertaken. However, the respondents could answer with whatever they wanted to write. The results reveal that most of them used the suggested response keywords. Later, after a full review of the psychological literature regarding motivation and play was completed, there was found to be a strong link between the psychological theories and opinions on motivation and play, and the suggestions originally presented at the questionnaire stage. The links are detailed later in this chapter, section 4.5, Development of the Tool Kit. Further discussion is also included in chapter 5, which reflects on the research and design journey taken in this study.

It is important to note that at this stage of the questionnaire the girls were not specifically being asked about software games, but about play and games in general. This had been done intentionally so that a more general response to play would emerge rather than that which may have been based upon existing leisure software features. It was considered important from a designer's point of

view that any proposals or concept designs were not built around only those girls who had an interest in software games, but that there was an attempt to find solutions that would make software games more appealing to this potential user group in general. If it was possible to establish the motivators behind what made these girls play any kind of games, the same motivators could drive concepts for interactive digital play media, which would stand more chance of being appealing to this user group.

Since the respondents were allowed to write whatever they liked, the total number of votes did not reflect the total number of girls responding, but rather the total number of feelings that were stated as a response.

In all there were 16 different answers given and 613 votes in total.

What feelings motivate you when playing a game?

The top responses that emerged from this question were:

- | | | |
|-----|-------------|-------|
| 1. | Have fun | 33.8% |
| 2. | To win | 20.9% |
| 3. | Participate | 10.1% |
| 4. | Be tested | 9.6% |
| 5. | Use skills | 6.7% |
| 6. | To learn | 5.2% |
| 7. | Survive | 3.1% |
| 8. | Control | 2.8% |
| 9. | Explore | 2.3% |
| 10. | Create | 2% |

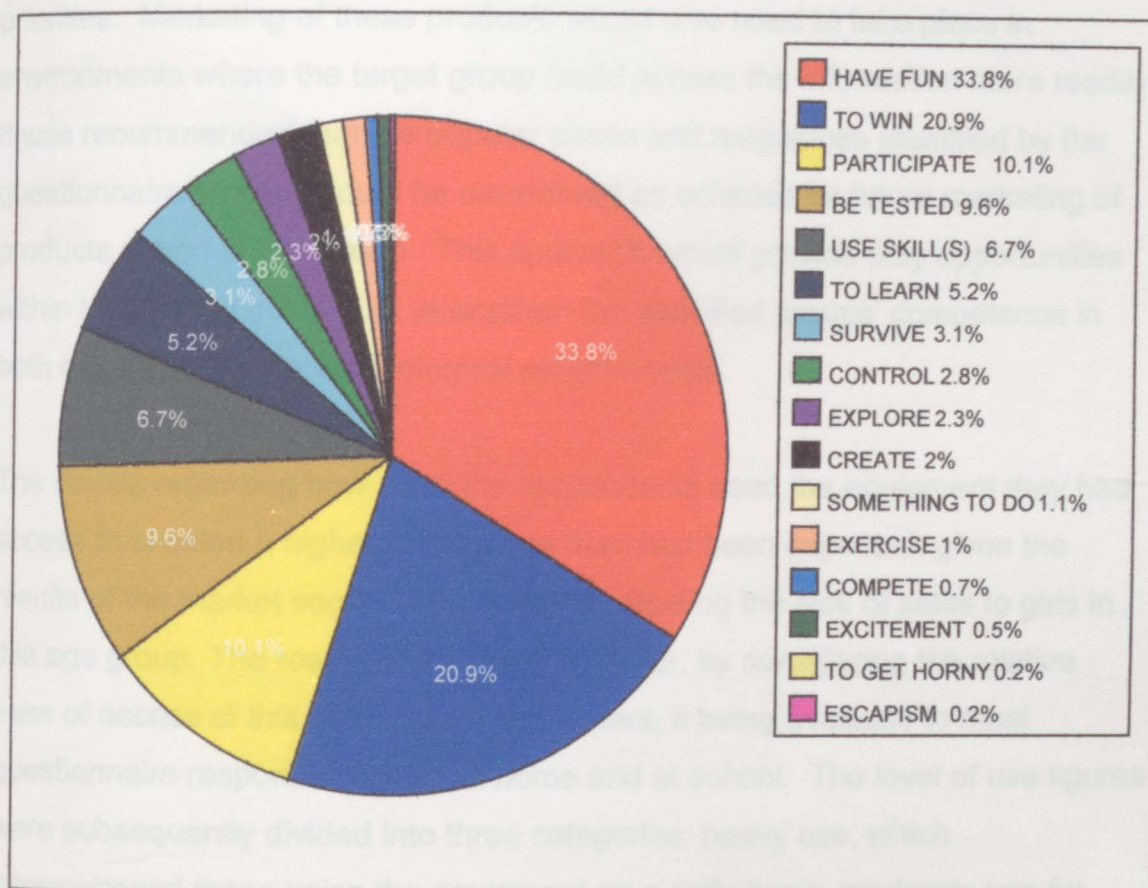


Figure 4.4.2.6 Questionnaire Result (Females aged 13-19)
What feelings motivate you when playing a game?
(Game Play Motivators)

4.4.3 Questionnaire Analysis and Conclusions

The most revealing result from the questionnaire stage of the market research study was that 51.1% of the targeted group of girls aged 13-19 years, were already playing leisure software products. Clearly the responses indicate that there was no real problem with gaining access to the technology, but this was not reflected in their purchasing decisions, with the most popular choice of what they would buy with £30 being clothes, followed by music. The obvious conclusion from these results is that leisure software products would need to be

developed that were more closely allied with this group's interests in order to create potential purchasing interest over their strong habitual spending priorities. Marketing of these products would also need to take place in environments where the target group could access the information more readily. It was recommended that the popular shops and magazines identified by the questionnaire survey should be considered as vehicles for future marketing of products aimed at this group. This approach would provide play opportunities within technology that would strengthen the specified groups' competence in both existing and new technological environments.

The results regarding how often the respondents used the equipment they had access to showed a higher level of use than had been expected, given the results of the market segmentation study indicating the lack of sales to girls in this age group. The result is explained however, by considering the relative ease of access of this group to the equipment, it being available to most questionnaire respondents both at home and at school. The level of use figures were subsequently divided into three categories; heavy use, which encompassed those using the equipment on a daily basis, moderate use for those who stated use once or twice per week, and light use for those who stated that they used the equipment once or twice a month or less. This analysis of use level was taken forward to the focus group analysis, where it was used to identify any potentially different patterns of behaviour within the focus groups. Figure 4.4.3 illustrates this breakdown and clearly identifies that the most common use behaviour is for moderate use, defined as once or twice per week.

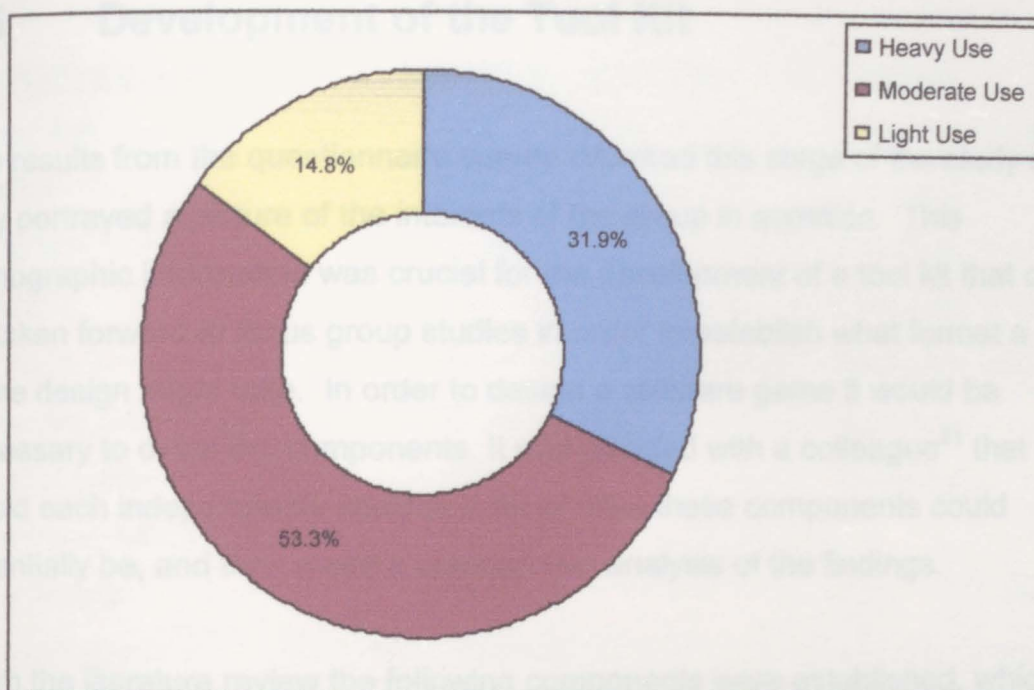


Figure 4.4.3 Questionnaire Result (Females aged 13-19)
How often do you use the equipment you have access to?
(Social Play Preferences)

The *social play preferences* and the *game play motivators* derived from the questionnaire results were therefore potentially essential factors in the design of any proposed leisure software products to be developed. These preferences and motivators became the initial components for the tool kit development that would be presented at the focus group stage and from which a more detailed new product specification could be established.

Analysis of the first two questions on the questionnaire, relating to personal and leisure interests, provided information that would be potentially very useful as a starting point for detailed product specification. Shopping and social pastimes had been expected to be popular choices, but obviously this targeted sample group was keen to keep fit as well, since sport received the most votes. All of the top five responses however, were in areas that could potentially be built on to make leisure software and interactive play more interesting to this group. These findings would become more relevant as the study progressed through the focus group stage and into any more detailed concept designs.

4.5 Development of the Tool Kit

The results from the questionnaire survey informed this stage of the study as they portrayed a picture of the interests of the group in question. This ethnographic information was crucial for the development of a tool kit that could be taken forward to focus group studies in order to establish what format a game design might take. In order to design a software game it would be necessary to detail the components. It was decided with a colleague²¹ that we would each independently compile a list of what these components could potentially be, and then make a comparative analysis of the findings.

From the literature review the following components were established, which comprised the main entries in my own list, list 1 (see figure 4.5a):

- The essential components of an interactive game considered necessary by a university game design course²²
- The possible objectives or motivators of play²³
- The genres that had developed so far. These were derived from the headings given to genres at the point of retail and in trade and specialist publications. These genres had emerged over the course of the short history of software games, but had become strongly established as categories and descriptive terminology in this field by the start of this study.
- The subjects of a game as detailed by game reviewers
- Elements considered relevant to interactivity with regard to human computer interaction
- The potential attributes of a character

These components were compiled as follows in order to make comparisons between the qualitative data and note any similarities and differences between the two lists that emerged (see figures 4.5a and 4.5b).

<u>Interactive course</u>	<u>Objective / Motivator</u>	<u>Genres</u>
Interaction	Kill (survive)	Shoot 'em ups
Conflict	Drive (control/explore)	Adventure
Escapism	Control	Platform
Safety	Fly (control/explore)	Simulators
Rewards	Fight (win/control/survive)	Beat 'em ups
Computer Gameplay	Explore	Puzzles
Clear Objectives	Win	Strategy
Cause and Effect	Participate	
Consistency	Survive	Play
Repeatability	Nurture	Nurture
Levels of difficulty		Explore
Animated intros & fill-ins	Learn (? nurture/survive)	Learn
Gameplayer Interface	Create	
	Laugh (nurture/explore/win/participate?)	
		Most of existing under 12 female market.
<u>Reviewers Areas</u>	<u>Interactivity components</u>	<u>Character attributes</u>
No. of players	Dexterity	Assertive
Gameplay	Reflexes	Caring
Graphics	Accessibility	Fit
Sound	Cognitive understanding	Active
Value		Funny
Difficulty		Clever
Learning Curve (time)		Capable
Version		Spiritual
Stability		Leadership
		Confidence etc...
	+ Lots of Creativity	

Figure 4.5a Comparative List 1 - Components of a software game

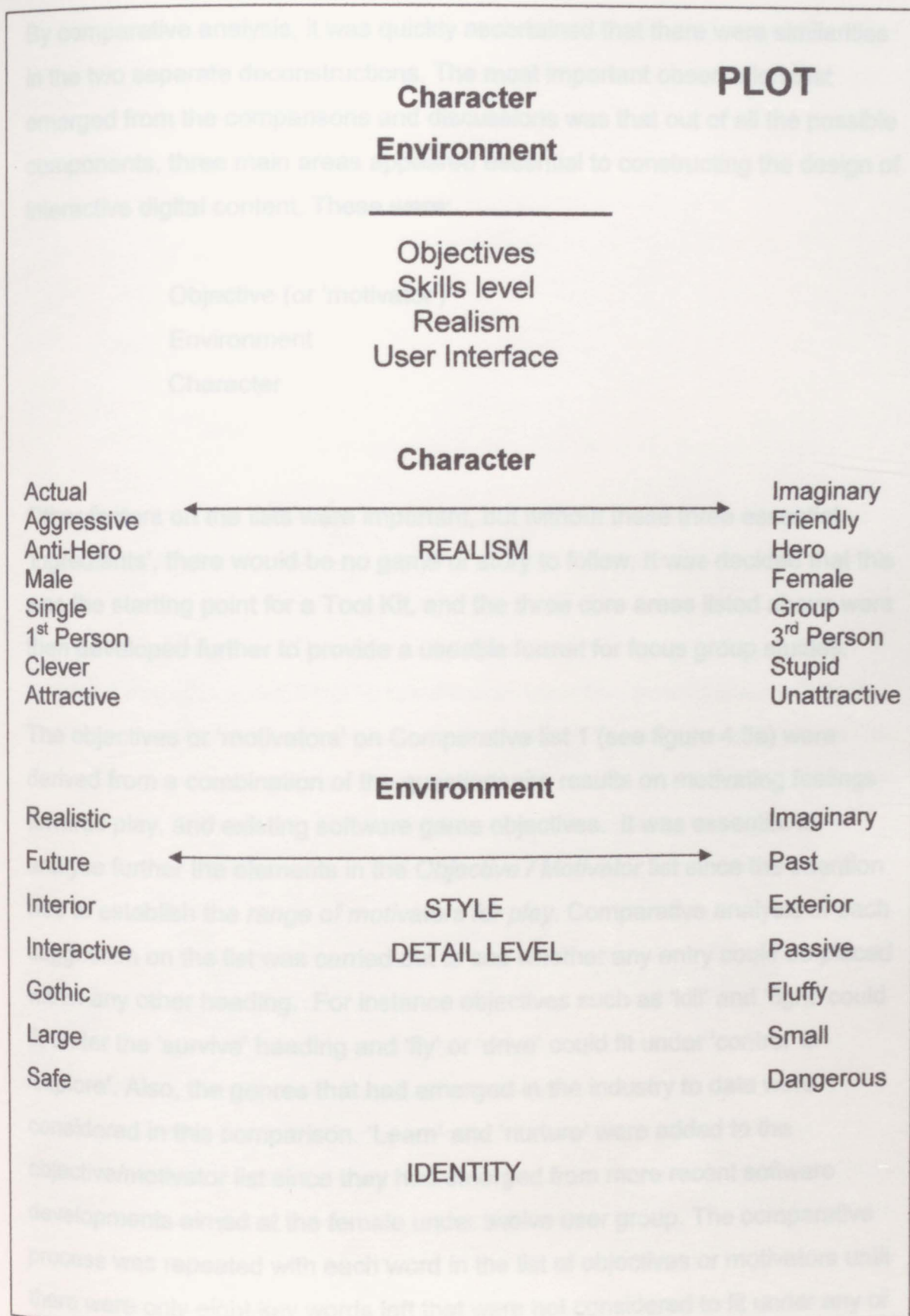


Figure 4.5b Comparative List 2 - Components of a software game

By comparative analysis, it was quickly ascertained that there were similarities in the two separate deconstructions. The most important observation that emerged from the comparisons and discussions was that out of all the possible components, three main areas appeared essential to constructing the design of interactive digital content. These were:

Objective (or 'motivator')

Environment

Character

Other factors on the lists were important, but without these three essential 'ingredients', there would be no game or story to follow. It was decided that this was the starting point for a Tool Kit, and the three core areas listed above were then developed further to provide a useable format for focus group studies.

The objectives or 'motivators' on Comparative list 1 (see figure 4.5a) were derived from a combination of the questionnaire results on motivating feelings towards play, and existing software game objectives. It was essential to analyse further the elements in the *Objective / Motivator* list since the intention was to establish the *range of motivators for play*. Comparative analysis of each suggestion on the list was carried out to see whether any entry could be placed within any other heading. For instance objectives such as 'kill' and 'fight' could fit under the 'survive' heading and 'fly' or 'drive' could fit under 'control' or 'explore'. Also, the genres that had emerged in the industry to date were considered in this comparison. 'Learn' and 'nurture' were added to the objective/motivator list since they had emerged from more recent software developments aimed at the female under twelve user group. The comparative process was repeated with each word in the list of objectives or motivators until there were only eight key words left that were not considered to fit under any of the other words. These are shown in bold in figure 4.5a.

The keywords to establish the range of *motivators for play* that were left were:

Control

Explore

Win

Participate

Survive

Nurture

Learn

Create

These 'play motivators' were then utilised as objective categories for the first Tool Kit sheet used for focus group studies (see figure 4.5.1).

It should be noted that although the top score for motivating feeling that had emerged from the questionnaire results was 'have fun' (see figure 4.4.2.6), it was assumed that anyone playing would expect to 'have fun' and therefore this option was considered too generic to be offered as a *objective/motivator* at the next stage of the Tool Kit. This decision was confirmed in light of Maslow's observation that it is possible for play to be unmotivated; 'a phenomenon of being rather than of striving, end rather than means.' (Maslow, 1954, 1970:238) In addition, the 'use skill' response from the questionnaire results was also not taken forward to the Tool Kit. It was decided that *skill*, rather than being a motivator, is more of a tool for achievement of a higher level of skill for any motivated activity and could therefore be relevant to any or all of the other headings. However, it should be noted that the positive feedback when progress is made in an interactive environment, is an important factor for consideration in the design of interactive play media.

Every original suggestion for *objective/motivator* or existing genre was then rechecked to see if it could fit into one or more of the new Tool Kit objective categories so that every possible motivator to play would be included.

A further comparison with the psychological literature revealed support for all of these remaining categories of *objective/motivator* that could be applicable within the context of play;

Control	Adler (1927) <i>superiority, will to power</i>
	Piaget (1951) <i>play aids development of cognitive skills</i>
	Maslow (1954) <i>competence</i>
	Freud (1955) <i>freedom to order and alter events</i>
	Tudor Hart (1955) <i>practicing skills, initiative</i>
Explore	Butler (1954) <i>curiosity and exploration</i>
	Tudor Hart (1955) <i>play needed for child to learn to know their world</i>
	White (1959) <i>playful exploration with environment increases effectance motivation and competence</i>
Win	Adler (1927) <i>striving for superiority</i>
Participate	Huizinga (1944,1955) <i>play can lead to the creation of new social institutions</i>
	Tudor Hart (1955) <i>through play that we make social contact with our peers</i>
	Erikson (1950,1963) <i>play has a crucial social quality</i>
	Piaget (1951) <i>play aids development of social skills</i>
	Ackerman (1999) <i>observations of socially interactive play in many areas of daily life</i>
Survive	Freud (1900,1953 & 1906-08,1959) <i>defence mechanisms</i>
	Adler (1927) <i>superiority</i>
	Tudor Hart (1955) <i>self-reliance</i>
	Ackerman (1999) <i>play is fundamental to evolution & survival</i>
Nurture	Erikson (1950,1963) <i>play is self-healing</i>
Learn	Erikson (1950,1963) <i>play is self-teaching</i>
	Tudor Hart (1955) <i>play helps us learn, train & practice new skills, helps us gain confidence, self-reliance, initiative & independence.</i>
Create	Huizinga (1944,1955) <i>play can lead to the creation of new social institutions</i>
	Freud (1955) <i>play helps us create a world apart from reality in which we have the freedom to order and alter events</i>

Figure 4.5c Taxonomy of Play Motivators

The above list, and psychological literature references, provided a working *taxonomy of play motivators*, which could guide further design development relating to the objective or motivator of interactive digital play media.

Comparative List 2 (figure 4.5b) indicated the extremes of character and environment attributes. This suggested the idea of offering these extremes as a choice to the focus groups in order to establish which way they would 'swing' with their choices (Bi-variate analysis). As many possible character and environment attributes that could be thought of were listed, along with their opposites.

A 'brainstorming' sheet of these suggestions was developed over a period of two weeks in order that anyone could add to it. It was also, hoped that further suggestions might emerge from the focus groups themselves. When no further additions could be made or thought of, a simple multi-choice illustration for both character and environment attributes was created which contained all the suggestions. These sheets were designed so they could be easily completed at focus group sessions.

By the end of this process the Tool Kit had developed into five stages for collecting data at focus group sessions. These stages comprised of four handout sheets and a play observation session. The contents of these are detailed below, exactly as they were presented to the participants, except they were each on a separate sheet of paper:

4.5.1 Tool Kit – Objective Sheet:

When playing a game, which of the following objectives would you choose?
(Please indicate your 1st, 2nd and 3rd choices.)

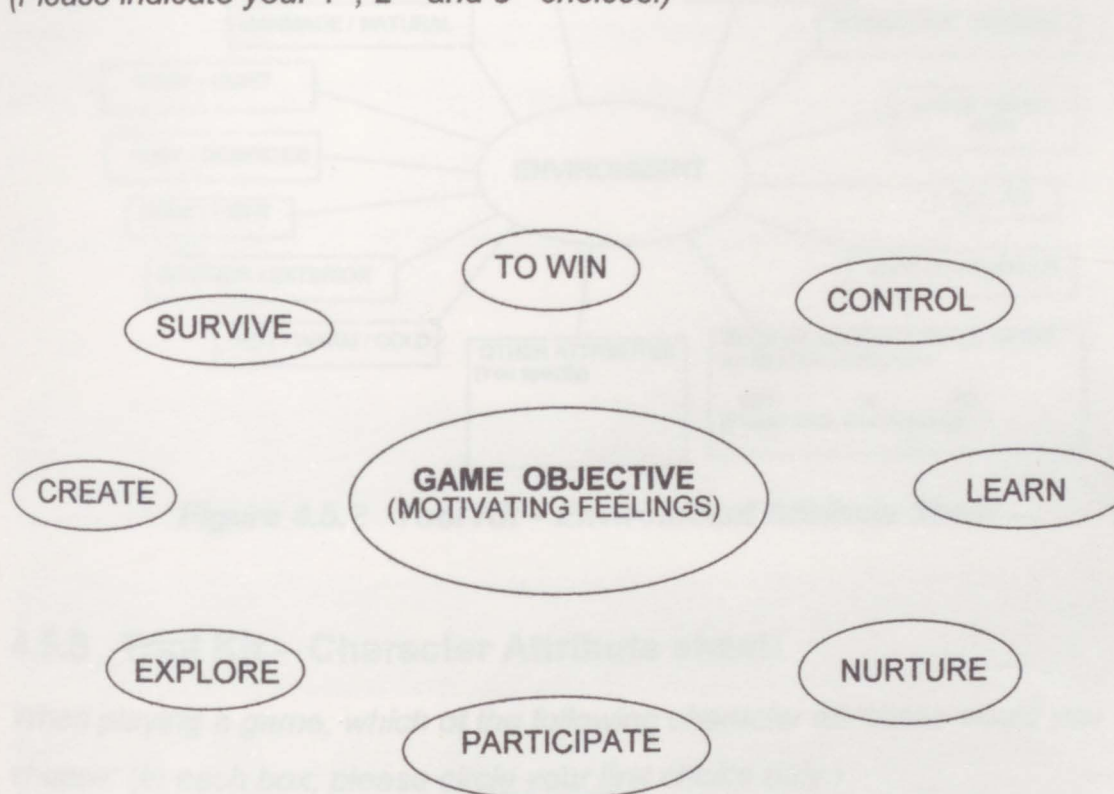


Figure 4.5.1 Tool Kit – Objective Sheet – Play Motivators

4.5.2 Tool Kit - Environment Attribute sheet:

When playing a game, which of the following environment attributes would you choose? (In each box, please circle your 1st choice only.)

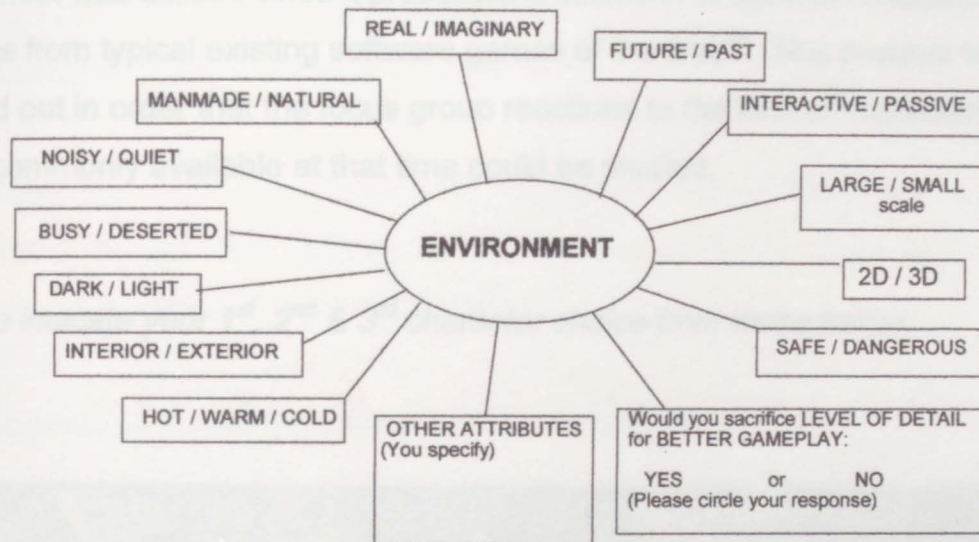


Figure 4.5.2 Tool Kit – Environment Attribute Sheet

4.5.3 Tool Kit – Character Attribute sheet:

When playing a game, which of the following character attributes would you choose: (In each box, please circle your first choice only.)

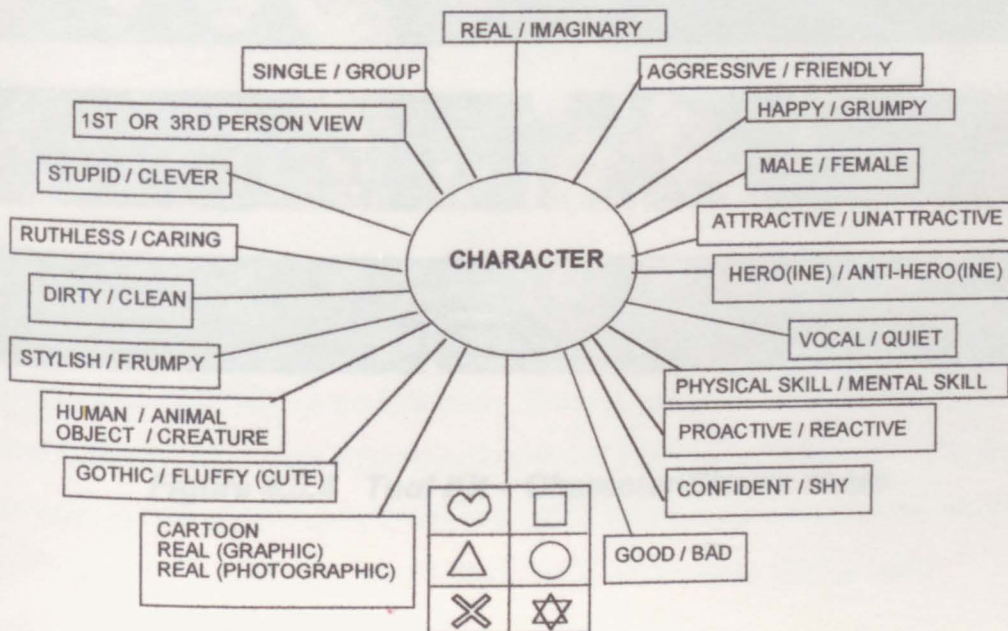


Figure 4.5.3 Tool Kit – Character Attribute sheet

4.5.4 Tool Kit – Character Choice Sheet:

This sheet was utilised since it presented a selection of common character images from typical existing software games of the time²⁴. This process was carried out in order that the focus group reactions to the kind of characters that were commonly available at that time could be studied.

Please indicate your 1st, 2nd & 3rd character choice from those below:



Figure 4.5.4 Tool Kit – Character Choice sheet

4.5.5 Game play observation session

- In addition to the Tool Kit handout sheets, the focus groups were given a range of 30 current leisure software products (see Appendix 2.1) from which to select and play a game of their choice.
- While carrying out this exercise the participants were asked to complete a game comment sheet (see Appendix 2.2) relating to their interaction with various features of the games.
- The participants were observed during the session and their selection of game and their reactions to the interface and gameplay attributes were documented on the completed game comment sheets (see Appendix 2.3).

4.6 Stage 2a: User Behaviour Study - Core Attributes

4.6.1 Focus Groups and Results

The focus groups were comprised of participants from the questionnaire stage who were selected on the basis of their age, in order to achieve a cross range of ages from within the targeted age bracket, i.e. 13-19 years old.

In addition, the participants were selected by their teaching staff in order to attempt to represent a broad range of those with a strong interest in technology and those who had little or no interest. This was done in an attempt to produce concept proposals for new leisure software products that would include ideas and reactions representing opinion from girls with a broad range of interests and as a consequence produce results that could widen user participation.

There were three separate focus group sessions. One was held at an after school session, one with older school students during a free period of study and one out of school hours in an informal setting. There were 19 participants in the focus groups, six of these aged 13, five aged 14, one aged 15, two aged 16 and five aged 17. This age split is illustrated in the following diagram:

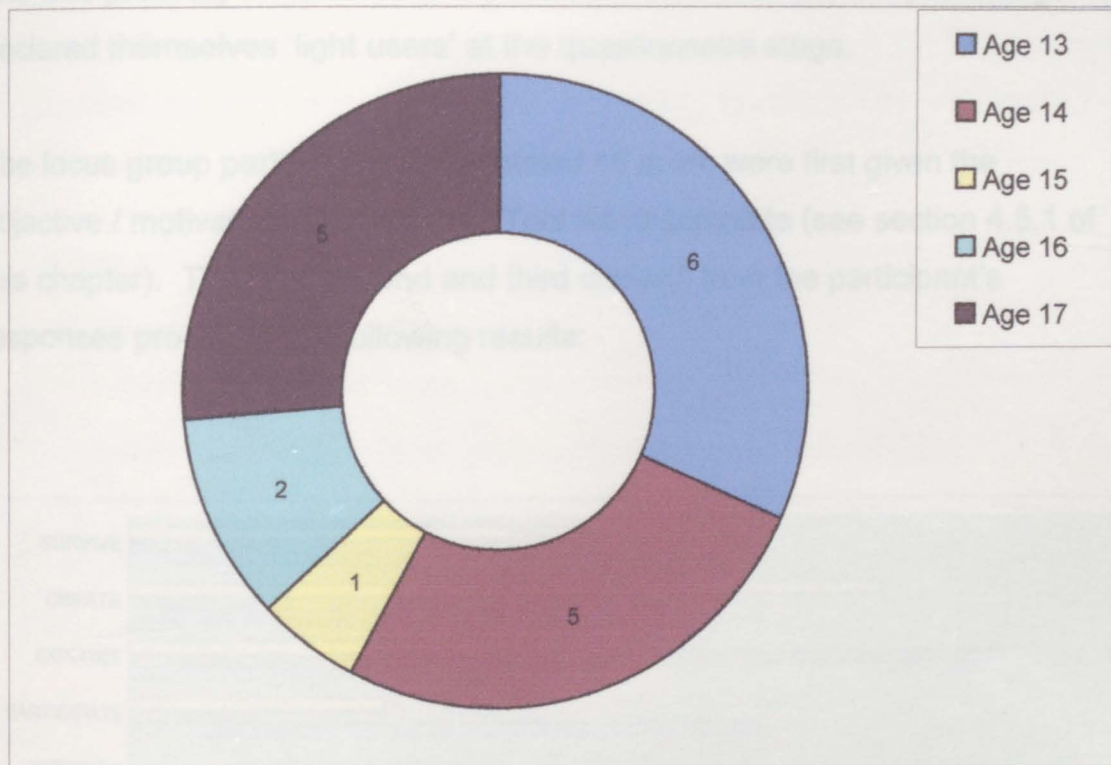


Figure 4.6.1.1 Illustration of focus group participant's ages

Interestingly, although every attempt was made by the staff to encourage girls to come forward for the focus groups from all ages and ranges of interest, the results from the questionnaires revealed that there were only a small percentage of respondents that identified what was termed 'light use' of the personal computer or games console to which they had access. The overall figures for the questionnaire respondents, detailed in section 4.4.2, made it more unlikely therefore that any even balance of users would be practically achievable in the focus group make up.

In fact, the practical organisation of the focus group sessions meant that they had to be scheduled either after school, or in free study periods, thus limiting

the amount of respondents who could take part. The final groups were therefore made up of respondents who were willing and able to take part at the times that could be arranged to co-ordinate with their school timetables. This did however produce a good range of ages across the desired target user groups and although there were no 'light users' represented, this could not be avoided and was probably an unrealistic expectation since such a small percentage had declared themselves 'light users' at the questionnaire stage.

The focus group participants, who totaled 19 in all, were first given the objective / motivator sheet from the Tool Kit to complete (see section 4.5.1 of this chapter). The first, second and third choices from the participant's responses produced the following results:

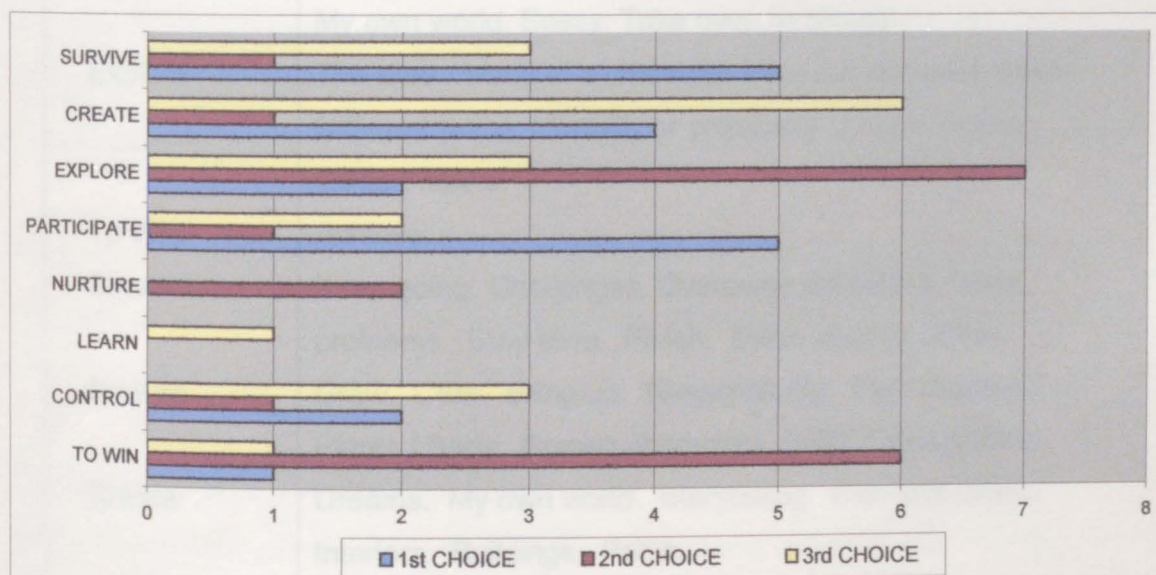


Figure 4.6.1.2 Tool Kit Result (Females aged 13-19)
First, second and third choice play motivators

Analysis of these and all focus group results are detailed in the next section (4.6.2) of this chapter, but in addition to the quantitative results obtained, it was deemed essential to understand the participant's interpretations of the words used on the tool kit sheets. This produced some interesting results. The following definitions were derived from collecting all of the different interpretations given by focus group participants, of the words used on the game objective sheet, this was achieved through brain-storming and discussion sessions within each of the focus groups. The interpretations for play motivators are as follows:

Motivator	Interpretation
Control	Characters. Movements. People and environment. My own world. Bossy. Take over. In charge.
Explore	The area / world of a character. Find out everyday things. Different paths. Mentally or physically. Jungle. Forest. Desert Island.
To Win	Achieve.
Survive	Keep going. Challenges. Overcome difficulties. Solve problems. Stay alive. Finish. Battle against others.
Nurture	Grow. Care. Bring up. Responsibility. Pet / Animals / Plants / Baby. Screen characters. (NOT Tamagotchis)
Create	Dreams. My own world. Storytelling. Film and music. Interiors. Buildings. Parks.
Learn	Generally. Tactics. Practice useful skills.
Participate	With characters. Take part. Interact with friends. Work as a team.

Table 4.6.1.1 Play Motivator Interpretations (Females aged 13-19)

Clearly all of these interpretations provided a detailed indication of how the particular target group viewed the objective or motivating feeling. These interpretations would be indicative of the motivator described and would therefore prove valuable within the concept development process of any potential leisure software products aimed at this group.

As noted earlier, it was important in this study to try to evaluate which features this particular group would prefer in a software game. It was imperative therefore that these interpretations be carried forward to any detailed design since the game play motivators could easily be misinterpreted if only the quantitative results were presented to a design team. Equally these results could be misinterpreted if left undiscussed at concept design level.

The interpretations were collected by first allowing the participants to fill out their own interpretation directly onto the tool kit sheet. Once all were collected, a discussion of the different interpretations was initiated and subsequent interpretations that arose during the discussion were explored and documented.

Similarly, interpretations were also collected for the other sheets within the tool kit sessions so that a document of motivator, environment and character word interpretations could be established.

The second sheet that the participants were required to complete was the environment attribute sheet (see section 4.5.2 of this chapter). On this the participants were asked to choose between opposites within a range of variables that would affect the detailed design of any game environment.

The results of the environment attributes emerged as follows:

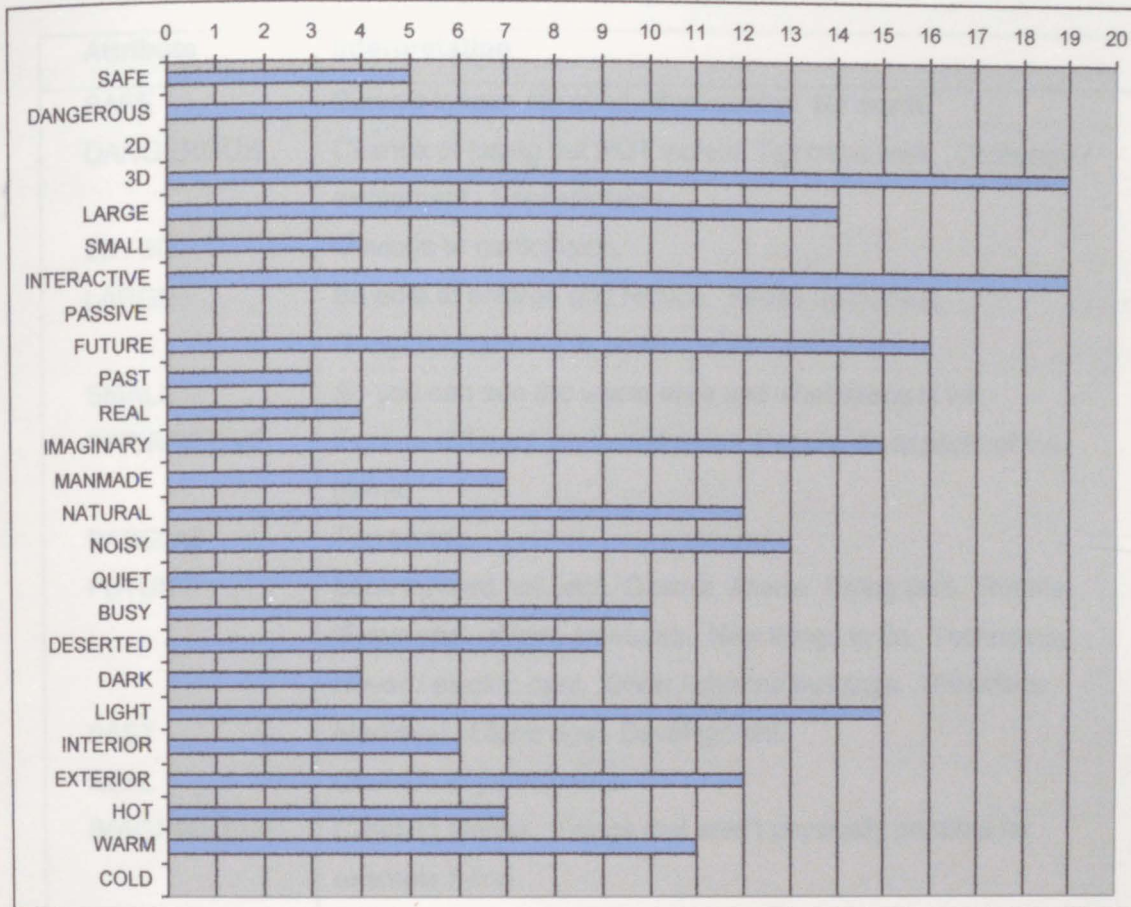


Figure 4.6.1.3 Tool Kit Result (Females aged 13-19)
Environment Attribute Preferences

Again the interpretations of the environment attributes were recorded and although lengthy at times, they give a crucial insight into the attributes deemed important to the focus group participants and the meanings attached to each attribute. These results are presented in full in order that as complete an understanding of the interpretations can be achieved. (See Table 4.6.1.2)

Attribute	Interpretation
SAFE	Survive longer. No guns. More control. No death.
DANGEROUS	Chance of losing but NOT violent. Tightrope walk. Challenge / excitement. Unpredictable.
2D / 3D	Obvious to participants.
LARGE	Be able to enlarge and reduce. Keeps up interest. Geographical area to cover.
SMALL	So you can see the whole area and what space is left.
INTERACTIVE	Explore different lands and areas. People. All aspects of the game.
PASSIVE	Too boring.
FUTURE	Look forward not back. Cosmic. Aliens. Flying cars. Robots. 'Futurama'. Weird creatures. New things to do. Technology. Hover / electric cars. Silver / chrome buildings. Unrealistic.
PAST	Medieval. Stone age. Development.
REAL	Obvious to participants.
IMAGINARY	Creating places. Things that aren't physically possible for example flying.
MANMADE	Tunnels. Hidden traps. Adventures.
NATURAL	Pleasant. Desert island. Jungle / woods / trees. Wild animals. Outdoors. Mountains. Animal noises.
NOISY	Noise of characters interacting. Music. General noise. Creepy noises sometimes like something might happen.
QUIET	Not silent. Music. General background noise.
BUSY	Not TOO busy or TOO crowded. Not overwhelming. Lots to interact with.
DESERTED	Things to be clear. Little village.
DARK	Gloomy. Gothic.
LIGHT	Sunlight. Daylight. Bright.
INTERIOR	Jungle / Caves / Houses. Shopping center. Square rooms with luminous colours lining corridors and ceilings / floors and spotlights. Big room and lots of people.
EXTERIOR	Wide open grassy area. Somewhere full of plants. Streets. Desert island. Jungle. New York.
HOT/WARM/COLD	Changes in climate or weather.

**Table 4.6.1.2 Play Environment Attribute Interpretations
(Females aged 13-19)**

In addition, the environment attribute sheet questioned whether the participants would sacrifice the level of graphical detail in a game for better game play. The results of this were quite split, with 10 votes for Yes and 8 votes for No. One participant passed on this question.

Also, the participants were given the option to add any other attributes that they felt were important, but that were not on the sheet. Quite a few responded to this and the full list of suggestions is as follows:

Fast (speed)
Colours (futuristic)
Colour
Colour
Speed
Colour
Clean environment
Scenery
Characters
Colour / bold
Purpose to play
Repeatable
Maze type games
Pleasant
Unlimited boundaries
"The Sims" is too limited to doing things in the house

**Table 4.6.1.3 Additional Environment Attributes suggested
Females aged 13-19**

Another attribute that arose in discussion sessions was the concept of time in a game. The focus groups felt that this should be reflected in environmental changes of lighting and seasons for instance.

All of these attributes were noted, so that they could be taken forward to be considered during any detailed design phase of new leisure software proposals. However one factor that emerged quite prominently on this list was colour, which was raised 5 times. It was therefore decided that this attribute be investigated in more detail at a second focus group phase. This phase of the fieldwork became known as the advanced tool kit and is detailed more fully later in this chapter in section 4.7: Development of the Advanced Tool Kit and section 4.8; Stage 2b: User Behaviour Study – Colour and Visual Images. It is important to note that the attributes of study for the Advanced Tool Kit were derived from the results that emerged from the initial focus group sessions.

The third phase of the initial focus group sessions was to present the participants with the character attribute sheet (see section 4.5.3 of this chapter). This again presented the participants with a choice between a range of bi-variables of different attributes of character. The results produced are plotted on the graph in figure 4.6.1.4 on the next page:

Figure 4.6.1.4 Tool Kit Result Forming part of the
Character Attribute Profile

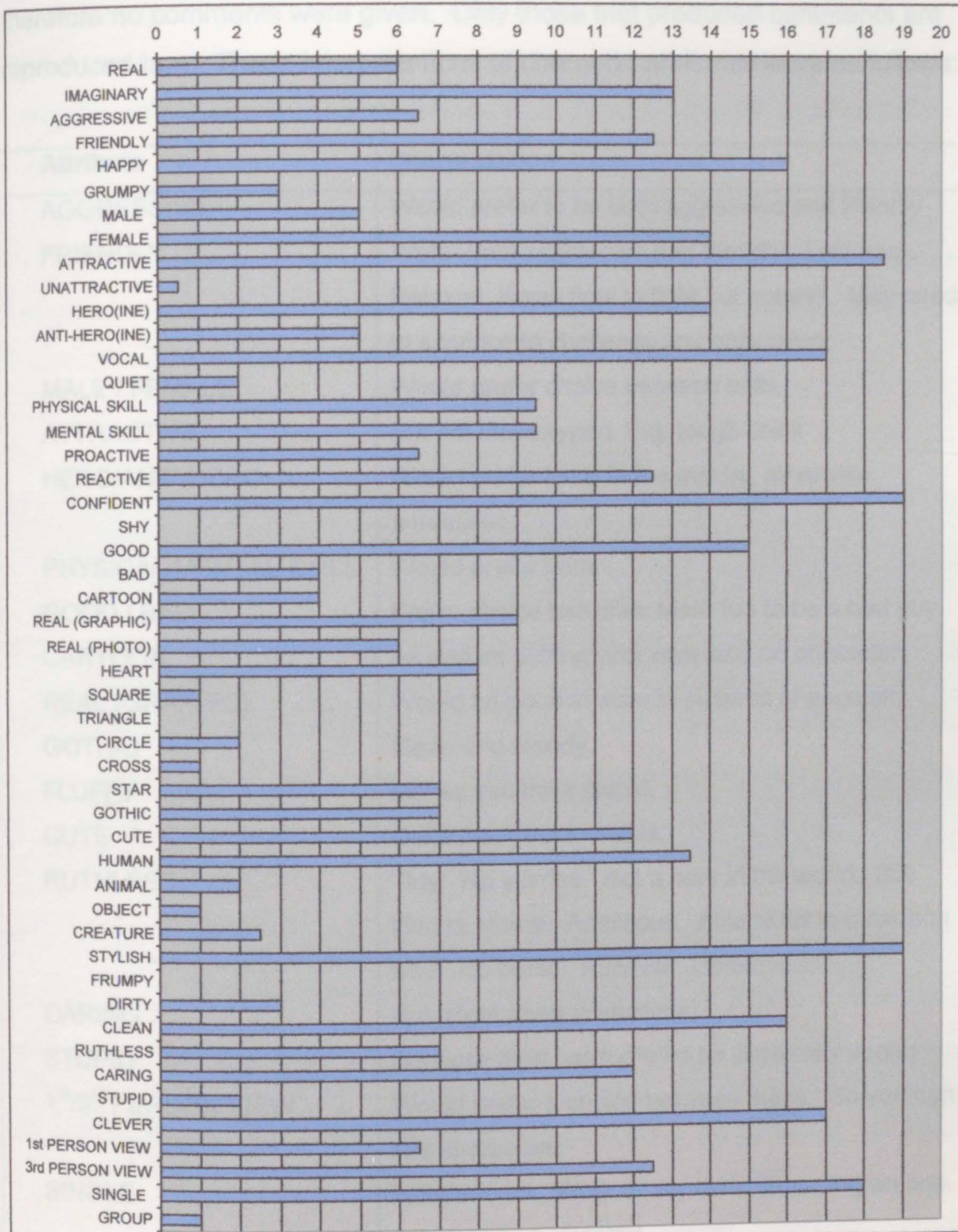


Figure 4.6.1.4 Tool Kit Result (Females aged 13-19)
Character Attribute Preferences

Again the participant's interpretations of the attribute descriptor words were recorded during a brainstorming and discussion session, in order that the most comprehensive understanding of their choices could be carried forward to any detailed design proposals. Some of the words were deemed obvious and

therefore no comments were given. Only those that produced comments are reproduced here. These interpretations of character attributes were as follows:

Attribute	Interpretation
AGGRESSIVE	Would prefer to be both aggressive and friendly
FRIENDLY	Prefer both aggressive and friendly. Laid back.
	Relaxed. Know how to fight but not evil. May need to sacrifice to challenge any opposition.
MALE / FEMALE	Would prefer choice between both.
ATTRACTIVE	But not stereotyped. E.g. tough chick
HERO/ANTI-HERO	Would prefer to be in the middle, otherwise unrealistic
PHYSICAL/MENTAL SKILL	Would prefer both.
GOOD / BAD	Prefer choice between. More fun to be a bad guy.
CARTOON	As well as putting your own face on character.
REAL (GRAPHIC)	Would be good to scan in pictures of yourself.
GOTHIC	Mean and moody.
FLUFFY	Makes you think stupid.
CUTE	Quite hard, but loveable.
RUTHLESS	Tidy. No worries. Not a care in the world. But kind to others. Ambitious. Able to kill in a cartoon way. No blood. Survival. Determined.
CARING	But might need to sacrifice.
STUPID	Because then I assume I'd be physically strong.
1 st /3 rd PERSON VIEW	Would prefer a choice between these. So you can see characters.
SINGLE	Independent. Work on my own. Focusing on one. Achievement. Control.

**Table 4.6.1.4 Play Character Attribute Interpretations
(Females aged 13-19)**

There was also a general comment agreed upon by the majority of the focus group participants, which was that it would be best to be able to be a different character, with variable character attributes both during and on each occasion of play.

The last stage of the initial focus group sheets involved the participants making a selection of their first, second and third choice characters from a range of character images presented (see section 4.5.4 of this chapter).

The results of this character choice were as follows:



Figure 4.6.1.5 Tool Kit Result (Females 13-19)
Character Choice Sheet Preferences

It was interesting that the choice of characters was not only female. In fact the gender split was equal; four male characters and four female characters were chosen.

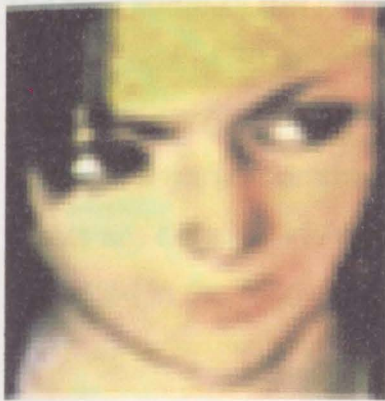
Additionally, it was observed that out of a choice of fifty different characters, all of the votes were directed towards only eight of the selection. The selection had been identified because it illustrated a typical range of game characters, yet less than a quarter of them appealed to the target group at all. Of the eight selected, only the top three received more than one vote.

The top two most popular choices were female and the third most popular choice, male. This was obviously an area that would deserve a great deal more research in detail than this study could cover. However it would be something requiring investigation during any detailed design process for games directed at this particular group of users.

The participants were also asked to indicate why they had chosen the particular characters. The comments made about the top three choices were recorded and revealed an array of different criteria by which characters were analysed by the target group. These comments are detailed in figure 4.6.1.6 on the next page.

He looks cool and strong and aggressive. Cool, strong, attractive and quite a boy's man. Does he look like a hero. Looks cool and like a Hollywood star, so that he would catch people's eyes. Looks normal and human but still adventurous. Mysterious, confident, strong, looks strong, invincible.

Figure 4.6.1.6 Tool Kit Results (Females aged 13-19)
Participants' comments on why they preferred the character chosen

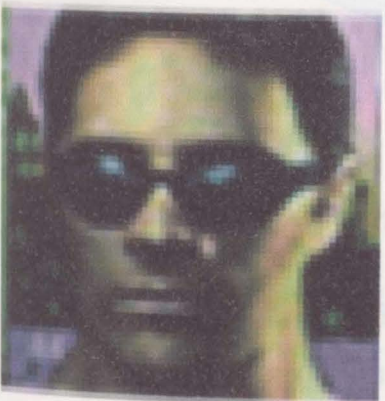


I like this one because it's got cool graphics and in a game I prefer to be a woman. She looks athletic, nice and aggressive. She looks strong and bold. This is me. Looks friendly. Looks 'normal' but willing to fight in dangerous situations. Looks tough – headband makes her look like a martial arts expert. Determined heroine – represents me. Mysterious looking, pretty, looks strong and young.



She looks like a girl with lots of fight in her. Quite fit and does look attractive. I thought it was colourful and looks like a nice person.

This is me. I chose this girl because I think a woman can be skillful and physically strong. I like the colour, she looks friendly. Looks feminine and realistic. Me in a temper. Looks interested in everything. She's very good looking, tough and she has very detailed graphics.

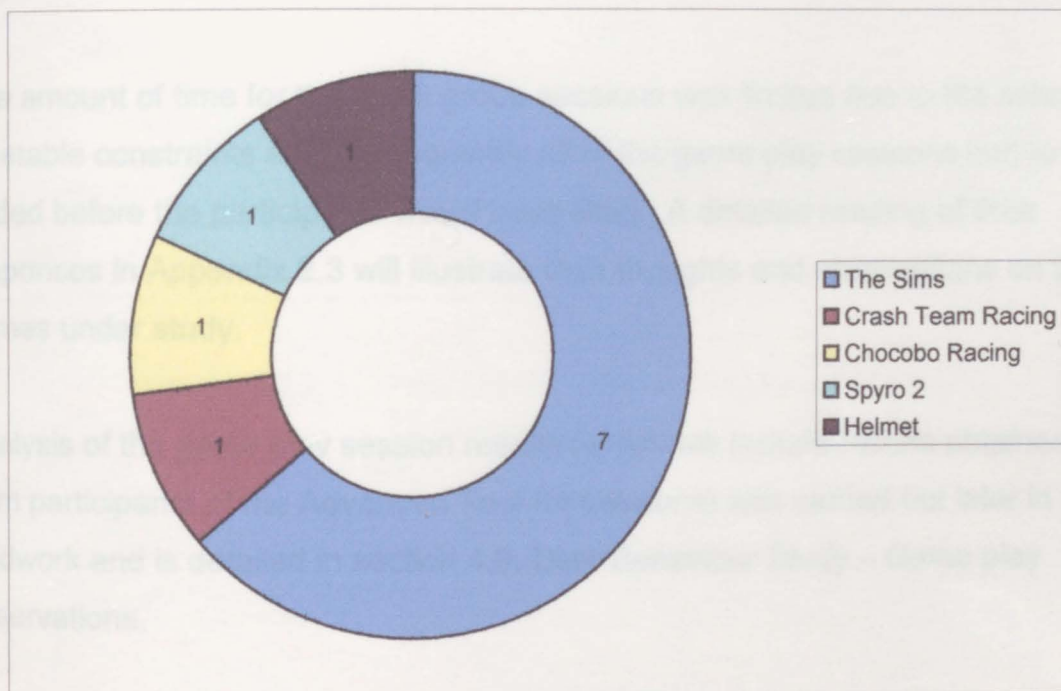


This is who I'd like to watch because he looks strong and good looking. Heroic, good looking, cool, tall, dark and handsome, stereotyped hero. He looks cool and strong and aggressive. Cool, strong, attractive and quite a lady's man. Also he looks like a hero. Looks cool and like a Hollywood star, so that he would catch people's eyes. Looks normal and human but still adventurous.

Mysterious, confident, strong, looks almost invincible.

Figure 4.6.1.6 Tool Kit Result (Females aged 13-19)
Participants reasons given for preference of character chosen

The final stage of the initial tool kit process involved the participants choosing from a range of 30 different leisure software products (see Appendix 2.1) and undertaking a game play session. During this the participants were asked to complete a game comment sheet (Appendix 2.2). The results of these comment sheets are detailed in Appendix 2.3 and the most popular games chosen are presented in the following diagram:



**Figure 4.6.1.7 Tool Kit Result (Females aged 13-19)
Games chosen by participants for game play session**

Due to the limited time available for the focus group sessions, not all of the focus group participants had time, once the tool kit had been completed, to try game play on the equipment provided. However, those that did have time, each selected a game of their choice from the list detailed in Appendix 2.1. There were 11 participants whose game choices for the game play session are recorded in figure 4.6.1.7 above. This illustrates the majority preference very clearly in favour of *The Sims*²⁵, a game only released within the month of the initial focus group sessions. *The Sims* game consisted of selecting from a choice of characters and living accommodations and then 'playing' the lives of the chosen characters within their homes. There were various options to

change the appearance of the home and to make the characters perform different tasks from a wide range of leisure and housework options. Additionally, the characters have to find work or attend school in order to progress and retain their character levels. These levels represented different physiological and emotional 'needs' to be satisfied. The game involved a number of variables to control and was set in an environment where time was a major factor in the game play.

The amount of time for the focus group sessions was limited due to the school's timetable constraints and subsequently all of the game play sessions had to be ended before the participants would have liked. A detailed reading of their responses in Appendix 2.3 will illustrate their thoughts and observations on the games under study.

Analysis of the game play session results (which will include results obtained from participants of the Advanced Tool Kit sessions) was carried out later in the fieldwork and is detailed in section 4.9, User Behaviour Study – Game play observations.

4.6.2 Analysis and Conclusions of Focus Group Results

The analysis of the initial focus group results began by concentrating on the particular objectives or motivators chosen for play.

The most popular first choice, that could be termed the *modal motivators*, were *participate* and *survive*, which each received equally 5 votes, 26% of the total votes. Close behind with 4 votes and 21% of the total votes, was *create* and then with 11% each (2 votes each) were *explore* and *control*. *Win* received 1 vote, 5% of the total as a first choice motivator and *learn* and *nurture* received no votes at all (see figures 4.6.2.1 and 4.6.2.2).

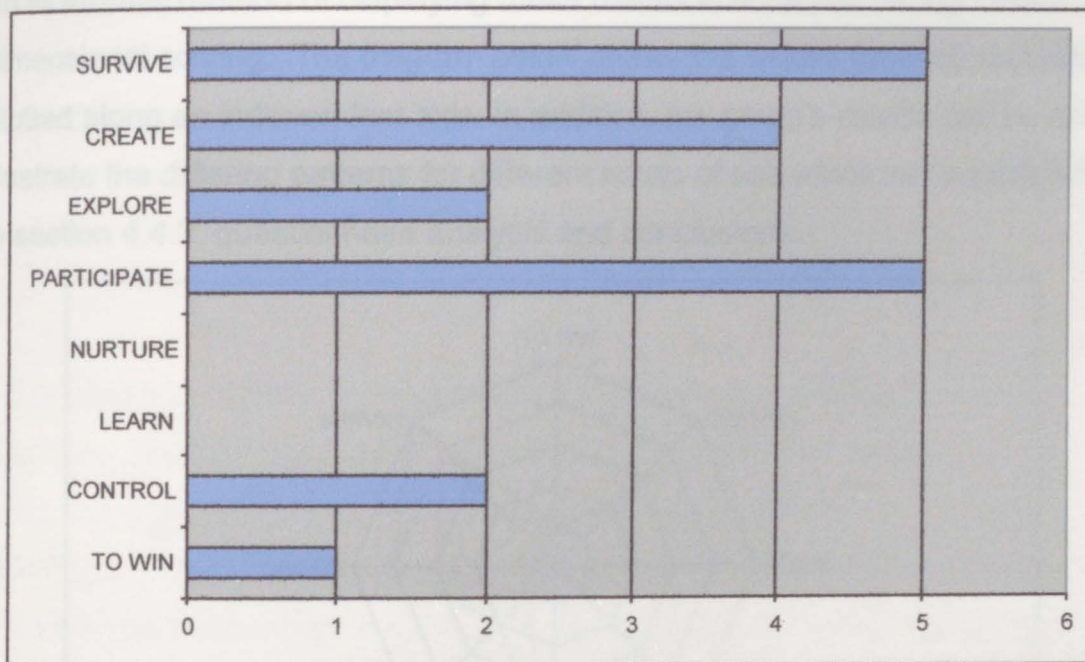


Figure 4.6.2.1 Tool Kit Result (Females aged 13-19)
1st Choice Motivator
median = 2.5 mean = 2.38

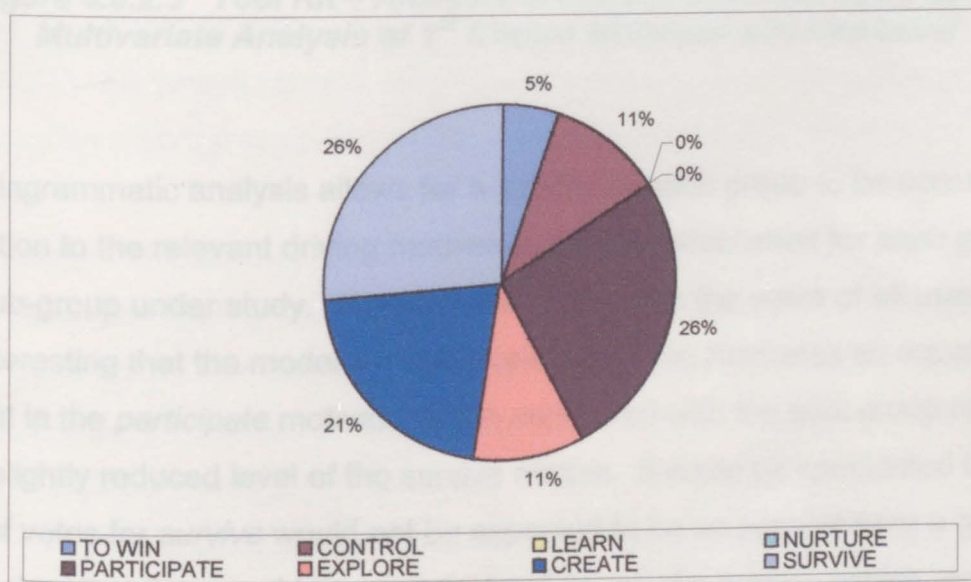


Figure 4.6.2.2 Tool Kit Result (Females aged 13-19)
1st Choice Motivators by percentage

An illustrative method of displaying these results is achieved through multi-dimensional scaling. The diagram below shows the results for each motivator plotted along an independent axis. In addition, the group's results can be split to illustrate the differing patterns for different levels of use which were established in section 4.4.3, questionnaire analysis and conclusions.

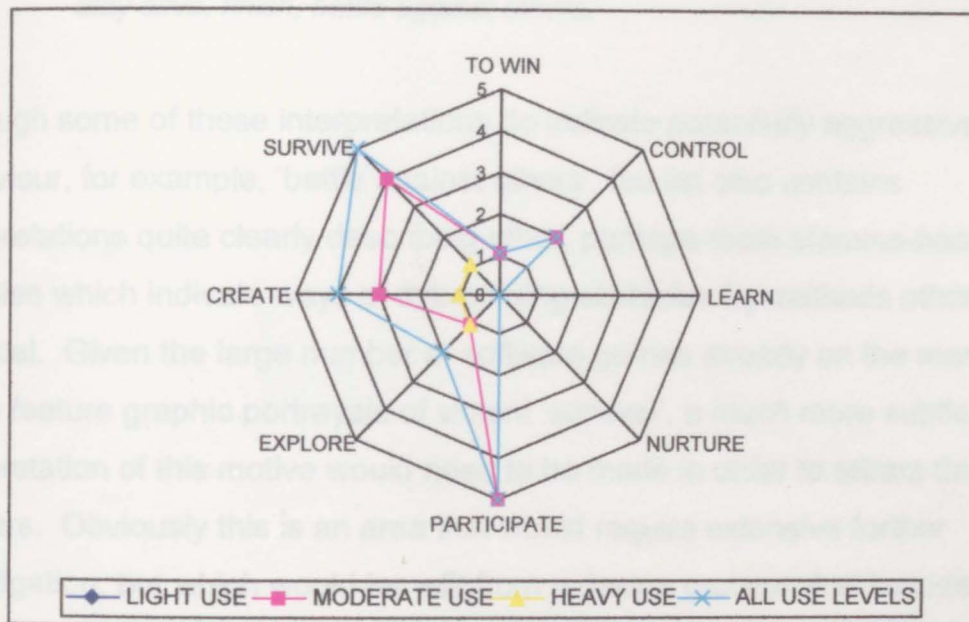


Figure 4.6.2.3 Tool Kit – Analysis of Results (Females aged 13-19)
Multivariate Analysis of 1st Choice Motivator and Use Level

This diagrammatic analysis allows for a 'profile' of each group to be constructed in relation to the relevant driving motivators of play established for each group and sub-group under study. The blue line represents the votes of all users, and it is interesting that the moderate use levels (pink line) illustrates an equal interest in the *participate* motivator when compared with the total group results, but a slightly reduced level of the *survive* motive. It could be speculated that the level of votes for *survive* would not be expected to be so popular from a group of females, that they would be more inclined to vote for *nurture* (which received no votes at all). However, a close inspection of the interpretations of the word *survive* reveals that a different translation of it as a play concept would be necessary to design interactive digital media that would include the particular kind of *survival* play indicated by these potential users.

The interpretations for all the motivators given by the group are detailed in table 4.6.1.1 earlier in this chapter. *Survive* is interpreted by the focus group participants as:

*keep going, challenges, overcome difficulties, solve problems
stay alive, finish, battle against others.*

Although some of these interpretations do indicate potentially aggressive behaviour, for example, 'battle against others', the list also contains interpretations quite clearly describing other, perhaps more stamina-based, activities which indicate ways of overcoming obstacles by methods other than physical. Given the large number of software games already on the market, which feature graphic portrayals of violent 'survival', a much more subtle interpretation of this motive would need to be made in order to attract this group of users. Obviously this is an area that would require extensive further investigation, but which would benefit from a design process that included the end users in its concept development phase. Reference to Taylor, Klein et al's (2000) study of Biobehavioral Responses to Stress in Females, could prove to be useful in this design context, since they propose 'unite' as a response to stress, rather than the more commonly assumed response of 'fight or flight'.

Further understanding may be derived from this particular group's interpretations when the environment attributes are considered. Here the emphasis is shifted from the intrinsic motivators of play to the arena within which preferred play would be based. Conjoint analysis was used to determine the bi-polar preferences of the target group to play environment attributes. Figure 4.6.1.3, earlier on in this chapter details the recorded results, but figure 4.6.2.4 illustrates, again through multi-variate analysis, a visual profile of the results from the focus groups carried out with females aged 13-19.

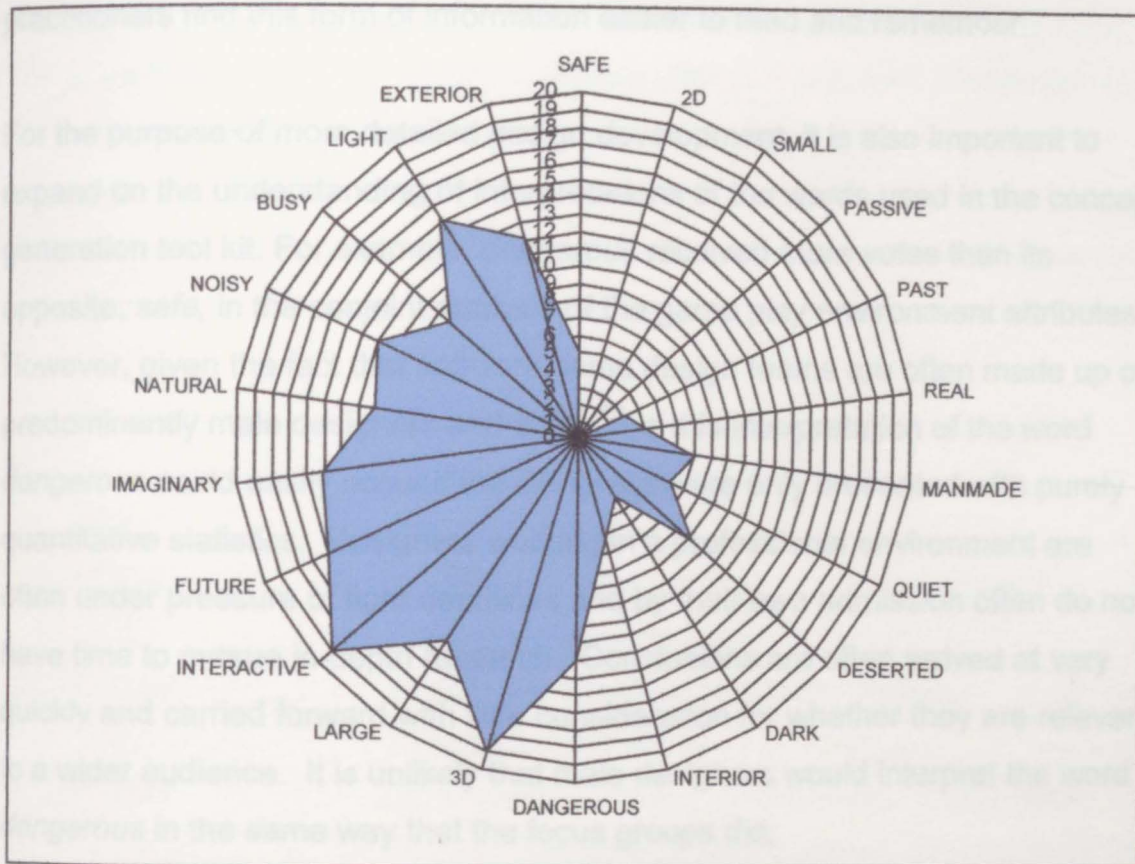


Figure 4.6.2.4 Tool Kit – Analysis of Results (Females aged 13-19)
Diagrammatic Profile of Focus Group Environment Attribute Preferences

This visual profile was intentionally arranged with the attributes mapped directly opposite each other so that a clear preference on the bi-polar scale can be observed. Additionally, the exercise can be repeated with other target groups, and a comparison of 'user profiles' can be established easily for each of the main play areas under investigation. A comparison of different target groups will be discussed in section 4.14, later in this chapter, where the results from the females aged 13-19 are compared with results obtained from a focus group with ages ranging from 25-50 years.

The method of analysis not only allows for a multi-variate display of statistics, but also enables a quick and visual process of information passage from the research results in a form easily understood by designers. The conversion of

statistics into a visual profile is an intentional one since most creative practitioners find this form of information easier to read and remember.

For the purpose of more detailed design development, it is also important to expand on the understanding of interpretations of the words used in the concept generation tool kit. For example, *dangerous* received more votes than its opposite, *safe*, in the conjoint analysis of the game play environment attributes. However, given the fact that software game design teams are often made up of predominantly male designers and artists²⁶, a mis-interpretation of the word *dangerous* could easily occur if the designers were only presented with purely quantitative statistics. Designers working in a professional environment are often under pressure of tight deadlines and by their own admission often do not have time to pursue in-depth research. Conclusions are often arrived at very quickly and carried forward with little consideration for whether they are relevant to a wider audience. It is unlikely that male designers would interpret the word *dangerous* in the same way that the focus groups did;

*Dangerous; Chance of losing but NOT violent. Tightrope walk.
Challenge / Excitement. Unpredictable.*

Perhaps the appeal of this objective/motivator is that it makes it possible to 'live out' exaggerated realities with no real personal risk, thus allowing a player to develop and improve skills in order to deal with the situation, whether in the real or virtual world. For this reason, the qualitative interpretations collected from the focus groups are as relevant to any analysis as the quantitative statistics which allow for a visual user group profile to be constructed.

It is also important to bear in mind that what players consider to be ideal in a software game will most probably be a dynamic phenomenon. Variety was very much raised by the focus groups as being the ideal for their particular preferences of all three areas under study; motivator, environment and character attributes. However, given a situation where the users had to make a trade-off between attributes (conjoint analysis), it was observed that the majority of their decisions were made quickly and decisively.

The key environment attributes identified by the target group of females aged 13-19 are illustrated in table 4.6.2.1. These attributes and their interpretations are considered 'key' because they received votes greater than the median score. They would help to identify an environmental concept that could be designed with the knowledge that it would potentially be more appealing to the target group than if the key identified attributes were ignored.

DANGEROUS	Chance of losing but NOT violent. Tightrope walk. Challenge / excitement. Unpredictable.
3D	Obvious to participants.
LARGE	Be able to enlarge and reduce. Keeps up interest. Geographical area to cover.
INTERACTIVE	Explore different lands and areas. People. All aspects of the game.
FUTURE	Look forward not back. Cosmic. Aliens. Flying cars. Robots. 'Futurama'. Weird creatures. New things to do. Technology. Hover / electric cars. Silver / chrome buildings. Unrealistic.
IMAGINARY	Creating places. Things that aren't physically possible for example flying.
NATURAL	Pleasant. Desert island. Jungle / woods / trees. Wild animals. Outdoors. Mountains. Animal noises.
NOISY	Noise of characters interacting. Music. General noise. Creepy noises sometimes like something might happen.
BUSY	Not TOO busy or TOO crowded. Not overwhelming. Lots to interact with.
LIGHT	Sunlight. Daylight. Bright.
EXTERIOR	Wide open grassy area. Somewhere full of plants. Streets. Desert island. Jungle. New York.
HOT/WARM/COLD	Changes in climate or weather.

**Table 4.6.2.1 Key Play Environment Attributes
identified by females aged 13-19**

These attributes once identified still allow for considerable creative freedom in the detailed design activity that would follow concept generation. As has been established in earlier chapters, it is the concept of interactive digital play media that often proves to be the hardest thing to generate. The group profiles that therefore arise from the proposed play concept generation method and its subsequent analysis provide a framework from which to build a more detailed and relevant game design prototype. This focused concept can then be re-tested with the original members of the target group under study, or indeed with larger numbers of users from that demographic and subsequent feedback and revision made. It is important with the proposed method that the users as stakeholders are kept central to the process by continually being consulted throughout the design and development of the concept.

Similar analysis could be made of the character attributes. However, from this particular focus group study, it was established that although there were particular character attributes that were popular, the main preference from participants was that game characters be constructed so that it would be possible to change them whenever the user chose, in order that the characters' personality and appearance would be variable. The results of character attribute preferences were detailed in figure 4.6.1.4 and although these results do indicate some potentially key characteristics, in discussion sessions with the focus groups, there was a strong preference, by the females aged 13-19, for being given the ability to create their own characters. In addition, they suggested having the choice of characters from a library of pre-generated characters or character parts that could be assembled. A particular suggestion was to be able to superimpose one's own face onto a character in order to personalise it. The technical ability to do this has already been achieved, but had not reached the mainstream market at the time of this study.

Obviously character preferences, as much as the other game play attributes, will be dynamic and dependent on both cultural and social influences of the time. However, in an industry that is struggling to find innovative and original

ideas, which have the potential to widen user competence with technology, this technique using stakeholder involvement could be the way to take steps outside of the current cycle of designing software games for those who already play them and feel comfortable and competent in the use of technology, to designing inclusive interactive digital media that is fun for everyone to play. The proposed method has the potential to produce totally innovative concepts that have a much wider appeal than just for the teenage girls originally studied.

A summary of the full Leisure Software: Play Concept Generation Technique, that emerged during the course of this study is given in section 4.12.1 later in this chapter. However, the next section details further development of the Tool Kit itself, which was specific to the user group under study during the initial fieldwork.

4.7 Development of the Advanced Tool Kit

It is important to reiterate that the attributes of study for the advanced tool kit that are documented in this section, were developed out of the results that emerged from the initial focus group sessions with females aged 13-19. Any advanced tool kit development for other target groups would therefore be dependent on similar or additional attributes raised in focus group sessions with them and may not be the same as those studied with the initial target groups.

The advanced focus groups contained 7 participants of the following ages: four aged 17; two aged 15 and one aged 14. Again there were time constraints on access to the focus group and so it was decided that the focus of this part of the study would be *colour* since this had been raised a number of times in the additional attribute section of the environment attribute sheet.

The focus of colour was also interesting since it was clear that a lot of emphasis was put on the visual imagery as a marketing tool for leisure software products. Perhaps further investigation of colour preference would reveal insights that might provide a better understanding of the potential target audience of females aged 13-19. During the preliminary fieldwork it had been established that some games had been developed which were primarily targeted at girls, but that these tended to appeal to a younger audience. It was also noted during that time that most of these were pink.

A simple method devised by Kobayashi (1998) for mapping personal colour preferences onto an 'image scale' was utilised for the advanced tool kit. The focus group participants were given a series of eight exercises to complete on paper. The original exercises by Kobayashi were slightly revised in order to reduce the amount time required for the participants to respond to the exercises, this would also reduce the amount of data generated. The only revisions therefore were in the number of responses requested, for example where 20 words were originally requested, the focus groups were asked to select only 10.

Copies of the exercise sheets presented to the participants are detailed in Appendix 3.1; however, a brief summary of each exercise is given in the following table:

Exercise 1	Select 10 colours from a selection of 130 scattered on a white background. Identify 5 colours that are disliked from the same selection.
Exercise 2	Select 10 'image words' from a selection of 180.
Exercise 3	Select 5 colour combinations made up of 5 colours together.
Exercise 4	Pick 5 colour combinations of 5 colours together for your 'fashion colour image'.
Exercise 5	Choose 3 chairs you would like to sit on from a selection of 12 café photographs of chairs/furniture.
Exercise 6-1	Choose the 3 window displays that you find most appealing from a range of 18.
Exercise 6-2	Choose the 3 buildings/cityscapes that you prefer from a range of 18.

Table 4.7.1 Advanced Tool Kit Exercise Summary (Females aged 13-19)

An additional image selection (Exercise 7) was also presented to the focus group participants at this stage. This was based on a random selection of 8 images, which were of abstract, natural and geometric forms. This exercise was not one that was devised by Kobayashi, but nevertheless followed a similar format.

The focus group session on this occasion followed a similar format to the initial focus group sessions, but with slightly different activities. Initially the participants were asked to complete the exercise sheets detailing their colour and image preferences. Then they were offered the opportunity of a game play session with the same range of software games on offer as at the initial focus group sessions (see Appendix 2.1). Finally they were asked to participate in

creating a game character of their own and describing and illustrating a dream or imaginary game situation. The results of the Advanced Tool Kit sessions with the focus group are detailed in the following three sections.

4.8 Stage 2b: User Behaviour Study

- Colour & Visual Images

4.8.1 Colour & Visual Images – Exercise 1

Exercise 1, detailed in table 4.7.1 asked the focus group participants to select 10 colours from a selection of 130 scattered on a white background. Appendix 3.1, Exercise 1, details exactly how the sheet was presented to the participants. The single colour preference results were then plotted, according to Kobayashi's method (1998) onto the hue and tone system (Munsell, 1915) where a pattern of preferences begins to emerge (see figure 4.8.1.1).

This analysis identifies which hues and tones are preferred and these results are subsequently plotted onto a *Single-Colour Image Scale*, (see figure 4.8.1.2). This scale was devised by Kobayashi in 1981 in association with the Nippon Color and Design Research Institute in Tokyo, Japan, which he had founded in 1966. Kobayashi describes the way the scale was constructed;

"This scale was created using psychological data and nuance; similar tones are linked. In terms of their colour image, vivid tones, for example, suggest nuances much different than those for dark grayish tones."

(Kobayashi 1998:12)



Figure 4.8.1.1 Advanced Focus Group Results (Females aged 13-19)
Single Colour Preferences plotted onto the Munsell Hue and Tone system

Kobayashi's *Single-Colour Image Scale* places each of the hues and tones from the Munsell system within one quadrant of the chart and allows for analysis of whether the participants' preferences lie in any particular quadrant.

The four quadrants are specified as:

Soft / Cool Cool / Hard Hard / Warm Warm / Soft.

As can be seen from the results (with each vote plotted as a black dot) for the female focus group aged 13-19, detailed in figure 4.8.1.2, it would appear that the results are scattered across the quadrants, but the total score for each quadrant was calculated (and appears in the corner of the respective quadrants) which illustrates a clear preference for the soft / cool quadrant (37 votes, 41.57%), with the soft / warm quadrant following in second place (25 votes, 28.09%), the cool/hard quadrant third (16 votes, 17.98%) and finally the warm/hard quadrant (11 votes, 12.36%), (see figure 4.8.1.2).

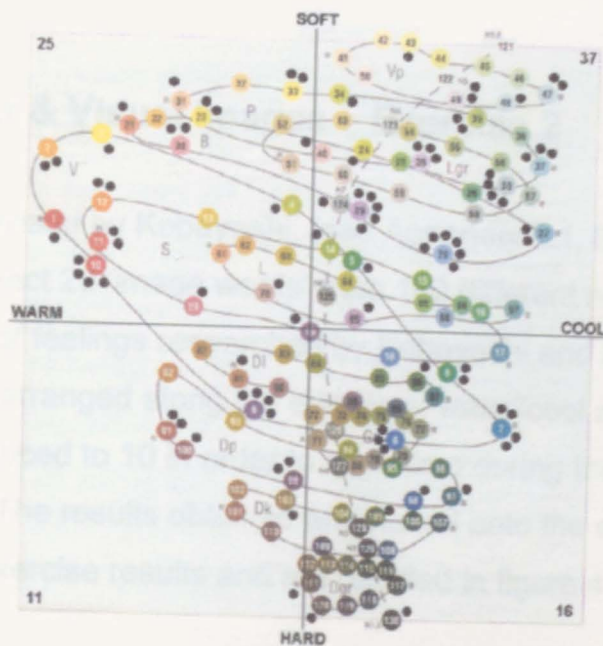


Figure 4.8.1.2 Advanced Focus Group Results (Females aged 13-19)
Single Colour Preferences plotted onto the Single Colour Image Scale
 devised by Kobayashi/Nippon Colour & Design Institute (NCD) © 1981

In addition, the final part of experiment 1 asked the participants to identify which single colours they disliked. The results of these votes are plotted onto the same *single colour image scale* in order to make a comparison (see figure 4.8.1.3). The majority of the colour dislikes fall into the warm/hard quadrant, the same quadrant that received the least votes for the 'single colour like' votes.

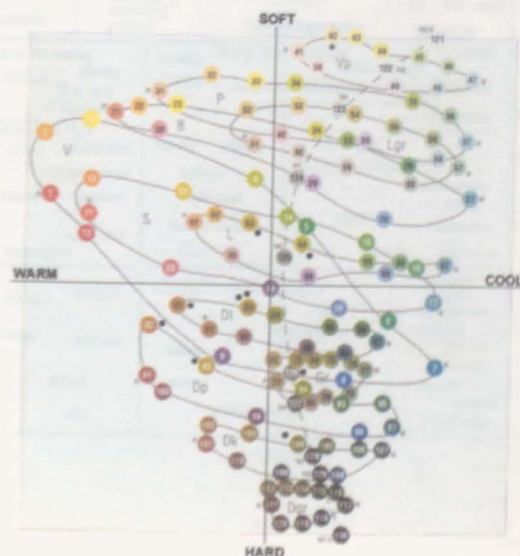


Figure 4.8.1.3 Advanced Focus Group Results (Females aged 13-19)
Single Colour Dislikes plotted onto the Single Colour Image Scale

4.8.2 Colour & Visual Images – Exercise 2

Exercise 2, as devised by Kobayashi, (see Appendix 3.1, Exercise 2), asked participants to select 20 'image words' from 180 different nuance words derived from a database of feelings researched by Kobayashi and NCD in 1986. The image words are arranged along the two axes: warm/cool and soft/hard. The selection was reduced to 10 in order to save time during the restricted focus group sessions. The results obtained are plotted onto the same analysis scale as the previous exercise results and are detailed in figure 4.8.2.1.

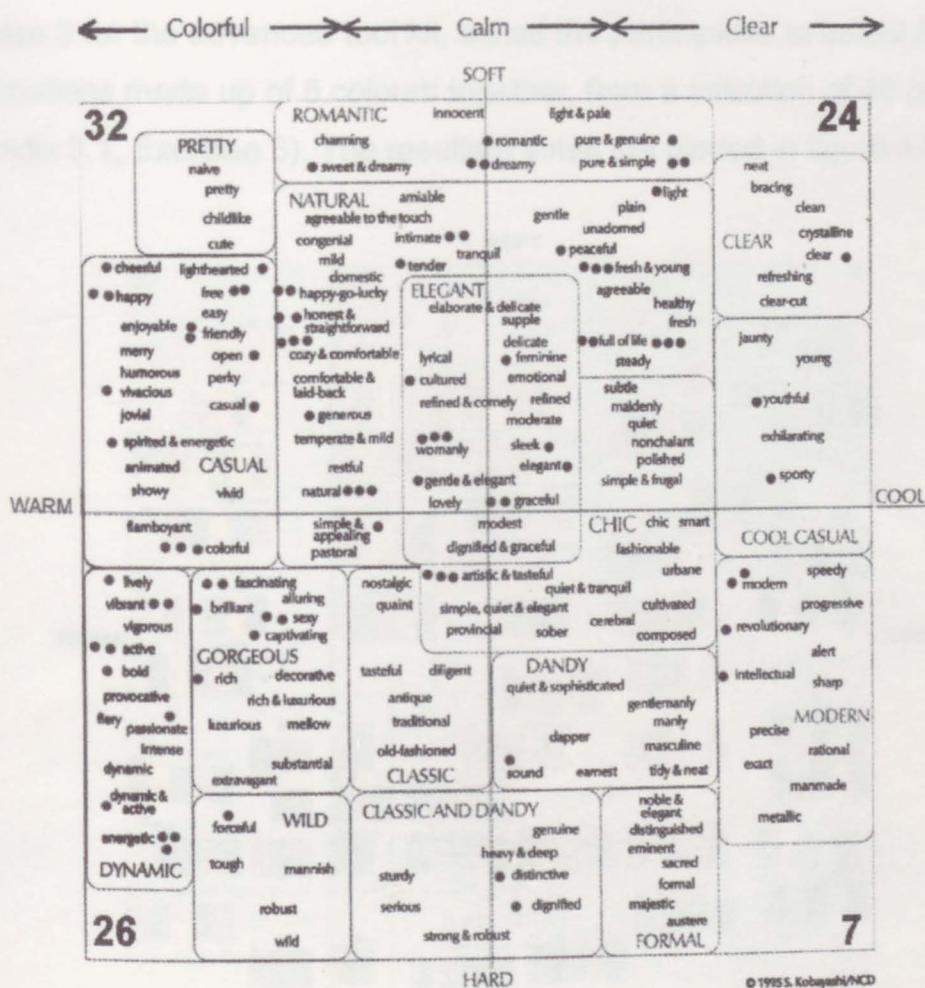


Figure 4.8.2.1 Advanced Focus Group Results (Females aged 13-19)
Preferences for image words from a database of feelings plotted onto a
Word Image Scale devised by Kobayashi/NCD © 1995

Here the emphasis on one particular quadrant is not so clear from the results. Most votes were received for the soft/warm quadrant, 32 votes (35.96%); the warm/hard quadrant received 26 votes (29.21%), the soft/cool quadrant, 24 votes (26.97%) and the cool/hard quadrant only 7 votes (7.86%). The scale was also subdivided vertically by Kobayashi into **colourful** (on the left), **calm** (in the centre) and **refreshing** (on the right). When analysed in this way, a clearer pattern of preferences emerges; **colourful** received 46 votes (51.68%), **calm** received 24 votes (26.97%) and **refreshing** received 19 votes (21.35%).

4.8.3 Colour & Visual Images – Exercise 3

Exercise 3 for the advanced tool kit, asked the participants to select 5 colour combinations made up of 5 colours together, from a selection of 48 (see Appendix 3.1, Exercise 3). The resultant votes are plotted in figure 4.8.3.1.

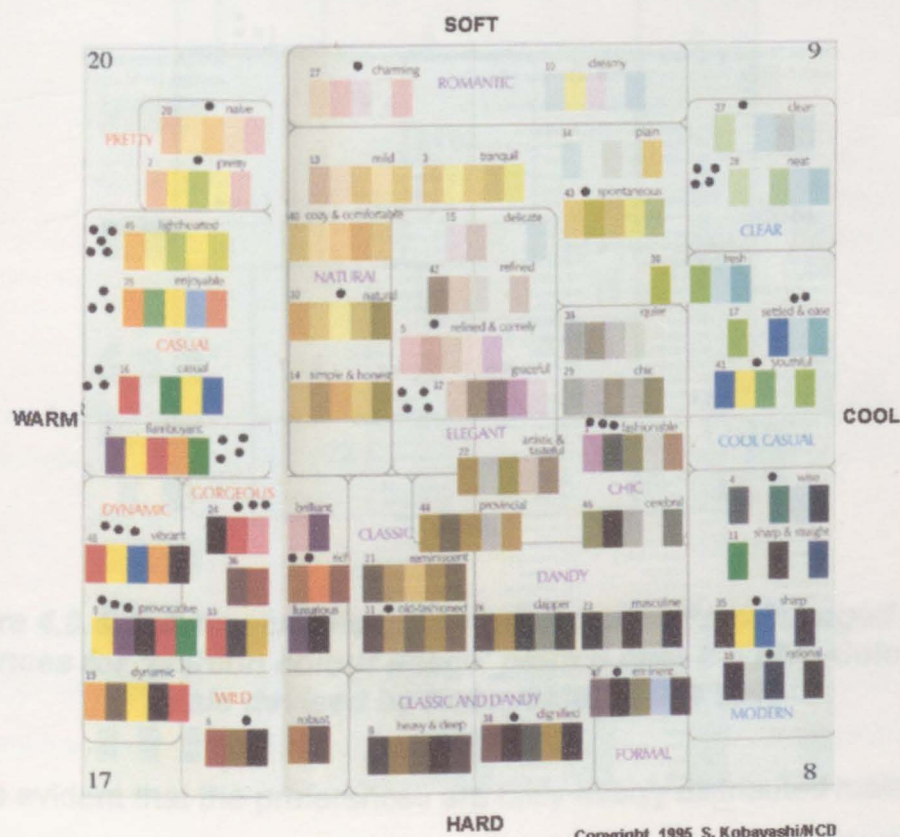


Figure 4.8.3.1 Advanced Focus Group Results (Females aged 13-19)
Preferences for 5 colour combinations plotted onto a Five-Colour Image
Scale devised by Kobayashi/NCD © 1995

Again there is a strong preference for the soft / warm quadrant, 20 votes (37.04%), but the warm / hard quadrant follows strongly in second place with 17 votes (31.48%). The soft/cool quadrant received 9 votes (16.67%) and the cool/hard quadrant 8 votes (14.81%).

4.8.4 Colour & Visual Images – Exercise 4

Kobayashi's exercise 4 contained two parts; the first asked participants to select again from a range of words relating to their fashion image and style of dress. The second part asked them to pick 5 colour combinations for their 'fashion colour image'. Only the second part of this exercise was adopted in the advanced focus group session due to the restricted time with the participants (see Appendix 3.1, Exercise 4.2). The results are detailed in figure 4.8.4.1.

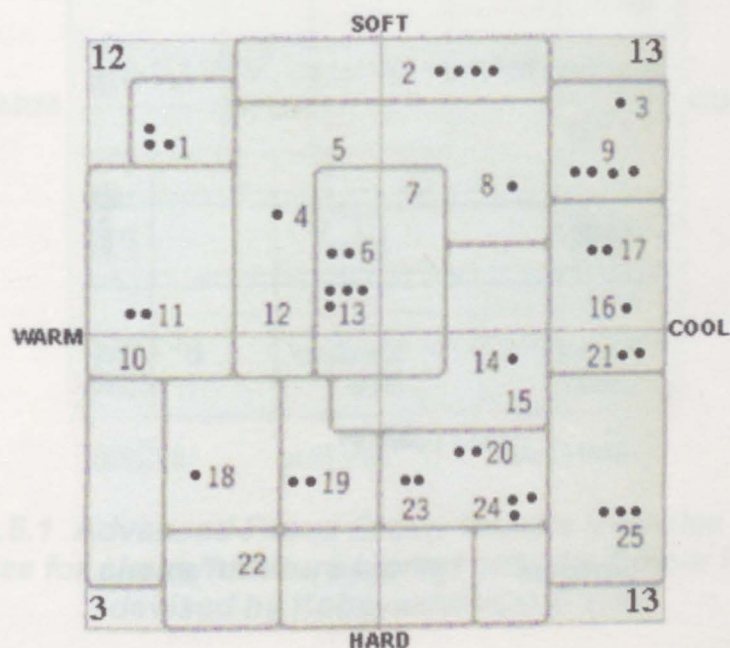


Figure 4.8.4.1 Advanced Focus Group Results (Females aged 13-19)
Preferences for 'fashion colour image' plotted onto the Five-Colour Image
Scale devised by Kobayashi/NCD © 1995

Here it is evident that the preferences are fairly evenly distributed mainly between three of the quadrants. The soft/cool, cool/hard and soft/warm, quadrants received almost equal votes, 31.71%, 31.71% and 29.27% respectively. The warm/hard quadrant only received 7.31% of the votes.

4.8.5 Colour & Visual Images – Exercise 5

In exercise 5, the participants were asked to select from a range of photographs of café chairs/furniture to illustrate which they would prefer (see Appendix 3.1, Exercise 5). This exercise was selected since it was considered that it would be useful to ascertain the user preferences with regard to objects and images of environments. Figure 4.8.5.1 indicates where the chairs/furniture images are located on the colour image scale. Again the results showed a strong preference for images within the soft/warm quadrant.

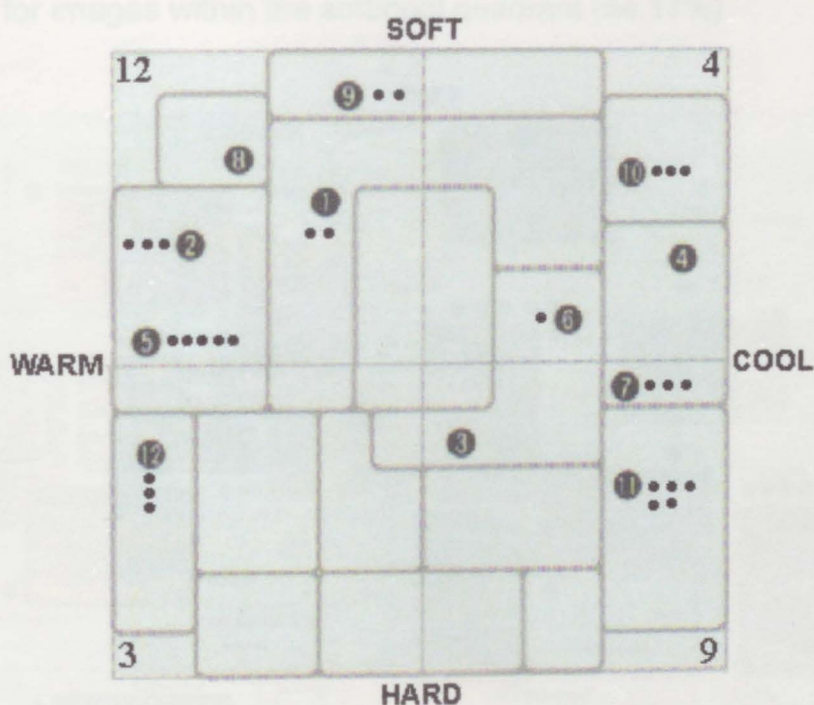


Figure 4.8.5.1 Advanced Focus Group Results (Females aged 13-19)
Preferences for chairs/furniture plotted onto the Colour Image Scale
devised by Kobayashi/NCD © 1995

Exercises 6 and 7 continue this study of preferences from the advanced focus group, with regard to different situations of objects, environments and images. It is interesting to observe how the preferences change with regard to the different contexts of application of the objects or environments.

4.8.6 Colour & Visual Images – Exercise 6

Exercise 6 was split into two parts; the first studied preferences of window displays from a range of retail outlets from Japan, Thailand, France, Germany, Argentina, England, Austria, Italy and Korea (see Appendix 3.1, Exercise 6-1). Again the results are plotted onto the colour image scale to analyse where the user preferences lie. For this target group there is now a shift to a strong preference for images within the soft/cool quadrant (54.17%).

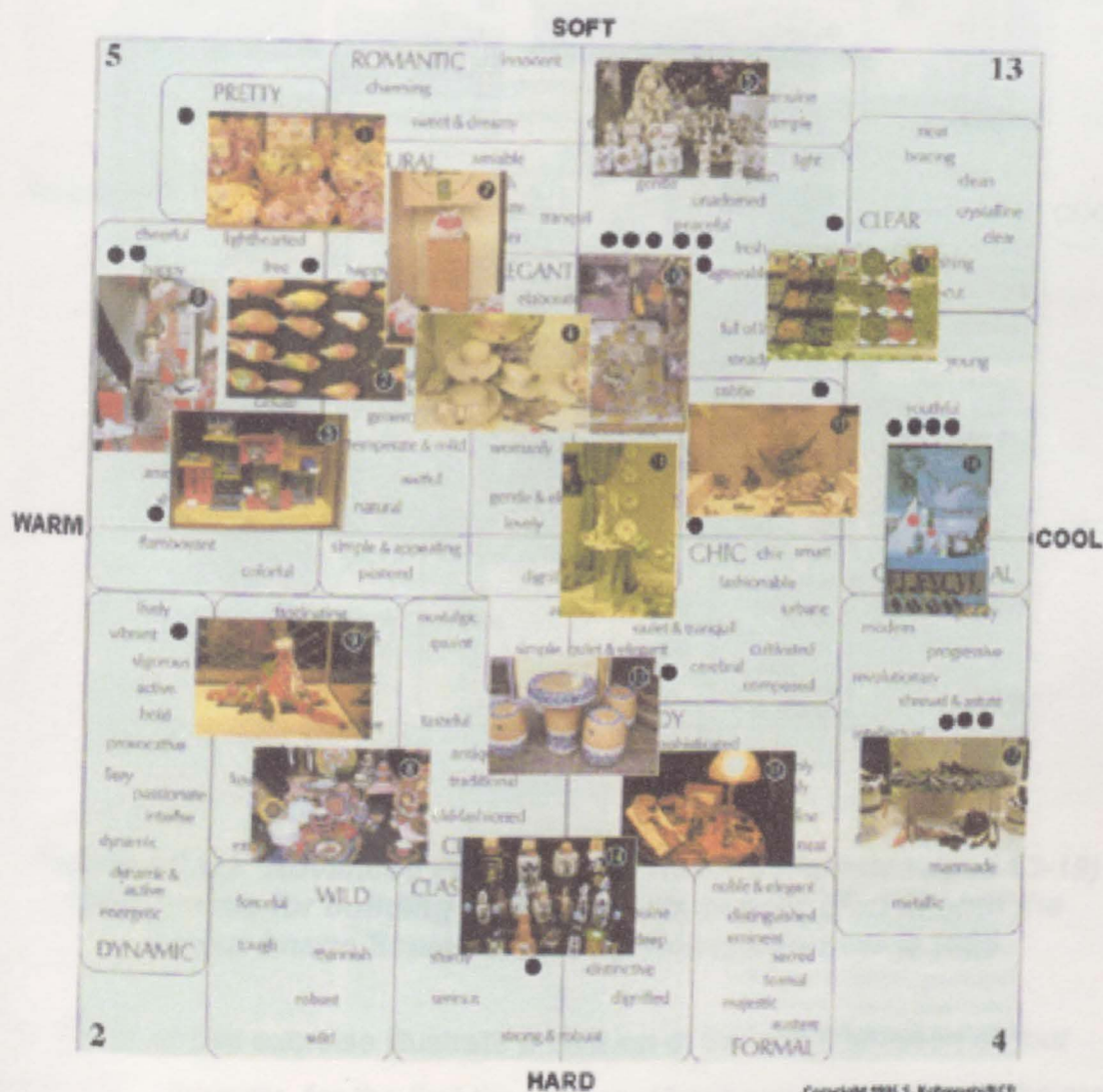


Figure 4.8.6.1 Advanced Focus Group Results (Females aged 13-19)
Preferences for window displays plotted onto the Colour Image Scale
devised by Kobayashi/NCD © 1995

The second part of exercise 6 studied the responses of the participants when asked to illustrate their preferences for images of building facades and cityscapes (see Appendix 3.1, Exercise 6-2).

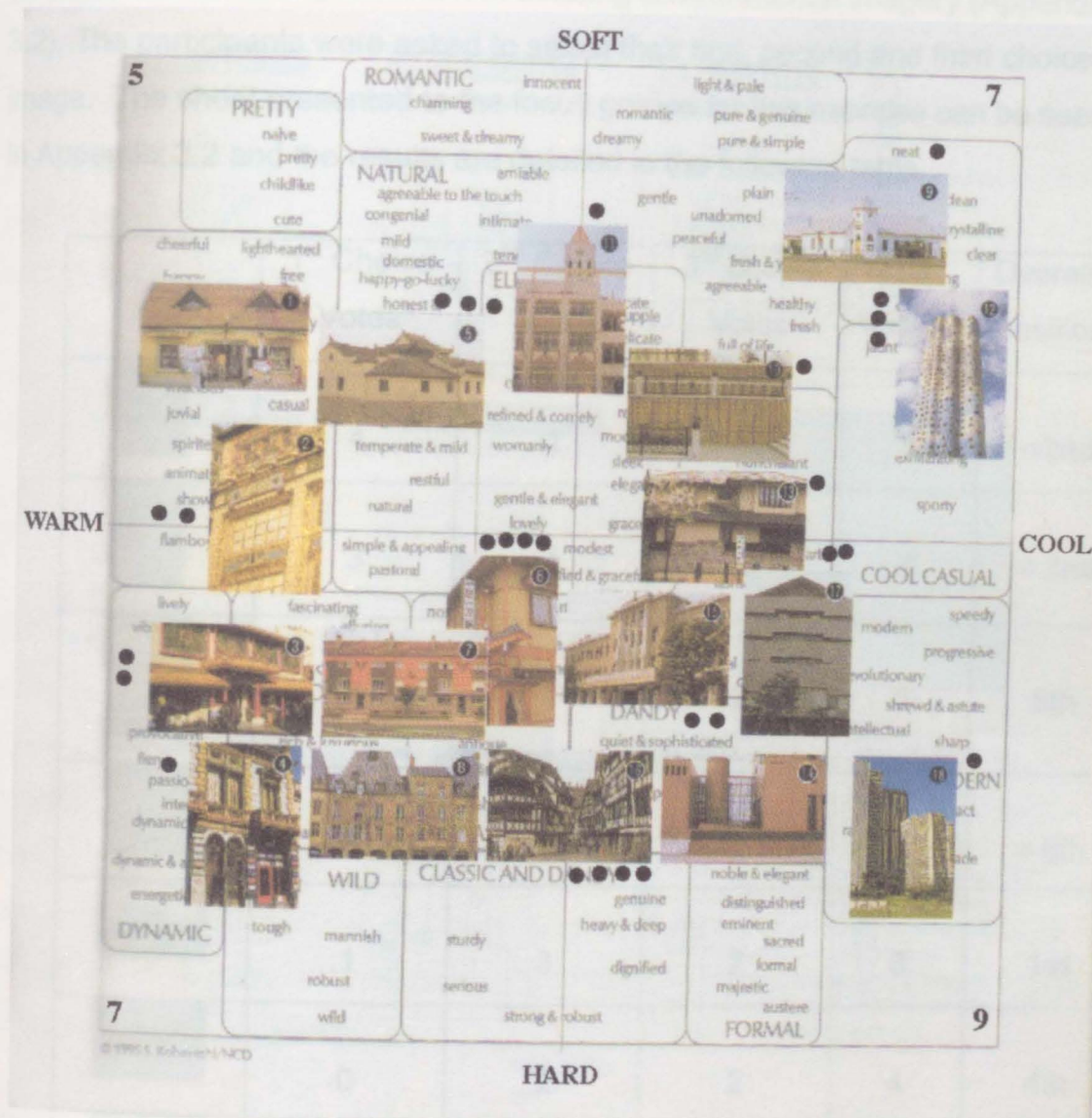


Figure 4.8.6.2 Advanced Focus Group Results (Females aged 13-19)
Preferences for building façade and cityscapes plotted onto the
Colour Image Scale devised by Kobayashi/NCD © 1995

The results of this exercise illustrate a division of the votes between all four quadrants. However, for the first time the cool/hard quadrant receives the most votes (32.14%), the soft/cool and the warm/hard quadrants receive equal votes (25% each) and the soft/warm quadrant receives 17.86% of the votes.

4.8.7 Colour & Visual Images – Exercise 7

The final exercise for the focus groups contained eight random images selected because of their strong depiction of differing environmental imagery (Appendix 3.2). The participants were asked to select their first, second and third choice of image. The sheet presented to the focus groups for this exercise can be seen in Appendix 3.2 and the results are detailed in the following table.









	1 st Choice Votes	2 nd Choice Votes	3 rd choice Votes	Total Votes	Overall Position
	4	1	0	5	=2nd
	3	1	1	5	= 2nd
	0	1	2	3	5th
	0	0	2	2	= 6th
	1	3	2	6	1st
	0	2	2	4	4th
	1	1	0	2	= 6th
	0	0	0	0	7th

Table 4.8.7 Advanced Focus Group Results (Females aged 13-19)
Preferences for 1st, 2nd & 3rd choice random images.

It should be noted that an extra two participants answered the random image selection exercise compared with the rest of the advanced tool kit exercises. These participants were from an additional focus group session which was arranged out of school hours in order to allow more time for the participants to complete the exercises fully. This process allowed the 'Create & Explore' sessions (detailed in section 4.10) to develop further than could be achieved in the school sessions, where the time was restricted to fit the school timetables. It also enabled more game play observation sessions (detailed in section 4.9) to take place during the study.

4.9 Stage 2c: User Behaviour Study

– Game Play Observations

The game play observation sessions detailed in section 4.5.5 of this chapter, were repeated as part of the advanced tool kit fieldwork, in order to establish as many opinions and comments about current leisure software products as possible from the target group of users. Appendix 2.1 details the range of 30 products that were presented for the groups to choose from. Each participant was asked to complete a game comment sheet (see Appendix 2.2) during or at the end of their game play session. All of the completed game comment sheets can be viewed in Appendix 2.3.

The results relating to which games were chosen during these sessions have already been documented in the results section of the initial focus groups (section 4.6.1, page 43). However, it should be noted that these could not be fully analysed until the Advanced Tool Kit sessions had taken place and all participants' responses been included. It was decided, during the development of the Advanced Tool Kit, that it would be particularly interesting to plot the participants' choices of software game onto Kobayashi's colour psychology image scale detailed in figure 4.8.1.2 earlier in this chapter. This was done in

order to establish whether there was any correlation between the packaging colour of the chosen products and the most popular colours identified by the colour psychology analysis. Figure 4.9.1 illustrates the quadrant positions of 21 of the games offered to the group.

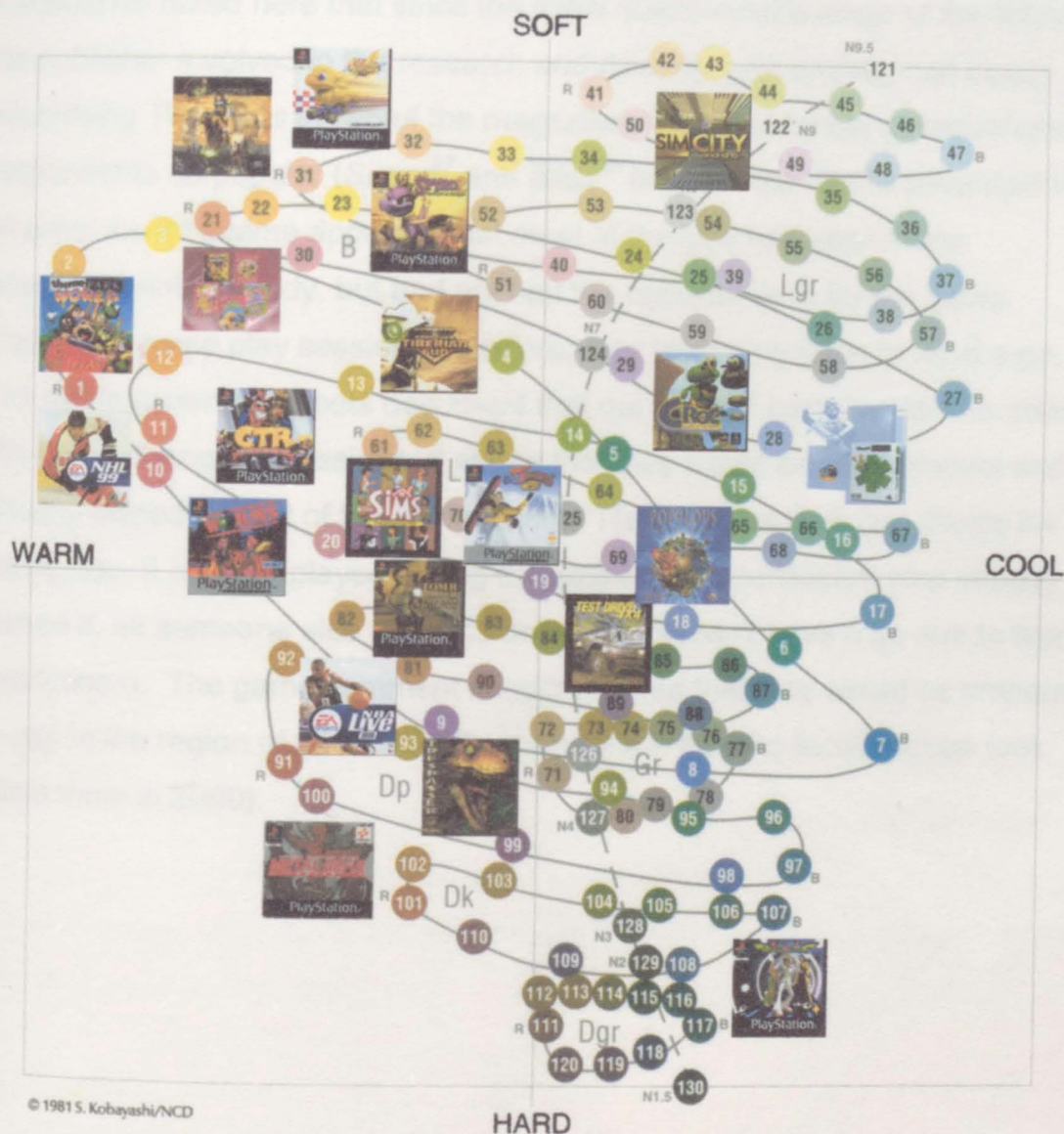


Figure 4.9.1 Colour Quadrant Positions of Games offered to Focus Groups (Females aged 13-19)

Analysis of this procedure appears in section 4.11 of this chapter. On reading the game comment sheets completed during these sessions (see Appendix 2.3), it was observed that the choice of leisure software products by the participants was mainly influenced by potential content of the game selected. Some of the females aged 13-19 revealed that they had prior

knowledge of certain games via mainly male members of their families. They stated that this had influenced their choice of game and some of them went for games that they had played before.

It should be noted here that since the initial questionnaire stage of the fieldwork, the publisher involved in the research and development project, had begun advertising *The Sims* in two of the magazines identified by the questionnaire respondents as popular (*Sugar*²⁷ and *Bliss*²⁸ magazines). At the advanced tool kit sessions it became apparent that most of the girls had seen these advertisements already, but had not had the opportunity to try the game. During the game play sessions therefore, they were very keen to have a go. The game comment sheets document that out of the 7 participants who chose this game during the sessions, 6 stated that they would buy this product and 1 already owned it. Out of the 7 who chose 'The Sims' as their first choice for game play, 5 actually played during the session (the participant who already owned it, let someone else play and one other couldn't have a go due to time restrictions). The game comment sheets detailed that they would be prepared to pay in the region of £20-35 for the game (note that the focus groups took place early in 2000).

4.10 Stage 2d: User Behaviour Study

- Create & Explore

The final part of the advanced tool kit sessions required participants to create a software game character of their own and to document and illustrate a dream or an imaginary situation that they could think of. The idea of illustrating a dream had been suggested at one of the meetings with the software publishing company by a senior member of their studio team. He felt that since a lot of male play was centered around imaginary or fantasy ideas, that to find out what a potential audience dreamed about, might help to 'get inside their heads'. His suggestion was therefore implemented at this stage of the process.

Six participants created characters and four detailed dreams or imaginary situations. The participants were provided with paper, drawing and colouring materials and a selection of magazines to cut images from if desired. Due to the time limitations, some participants asked whether they could take extra time to finish their creations. This was allowed, since they all showed quite an interest in this exercise and seemed particularly motivated to produce the best images they could. Some of the images were therefore taken away and returned a few days or a week after the focus groups had finished. The results are detailed in figures 4.10.1, 4.10.2 and 4.10.3.

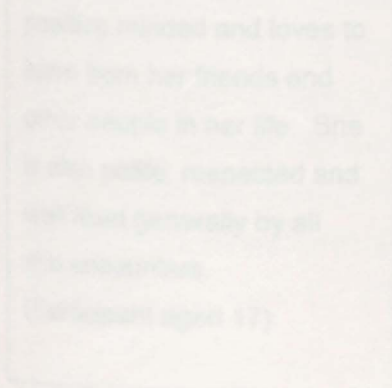


Figure 4.10.1 Characters for Software Game created by Advanced Focus Group Participants (Female aged 17-18)

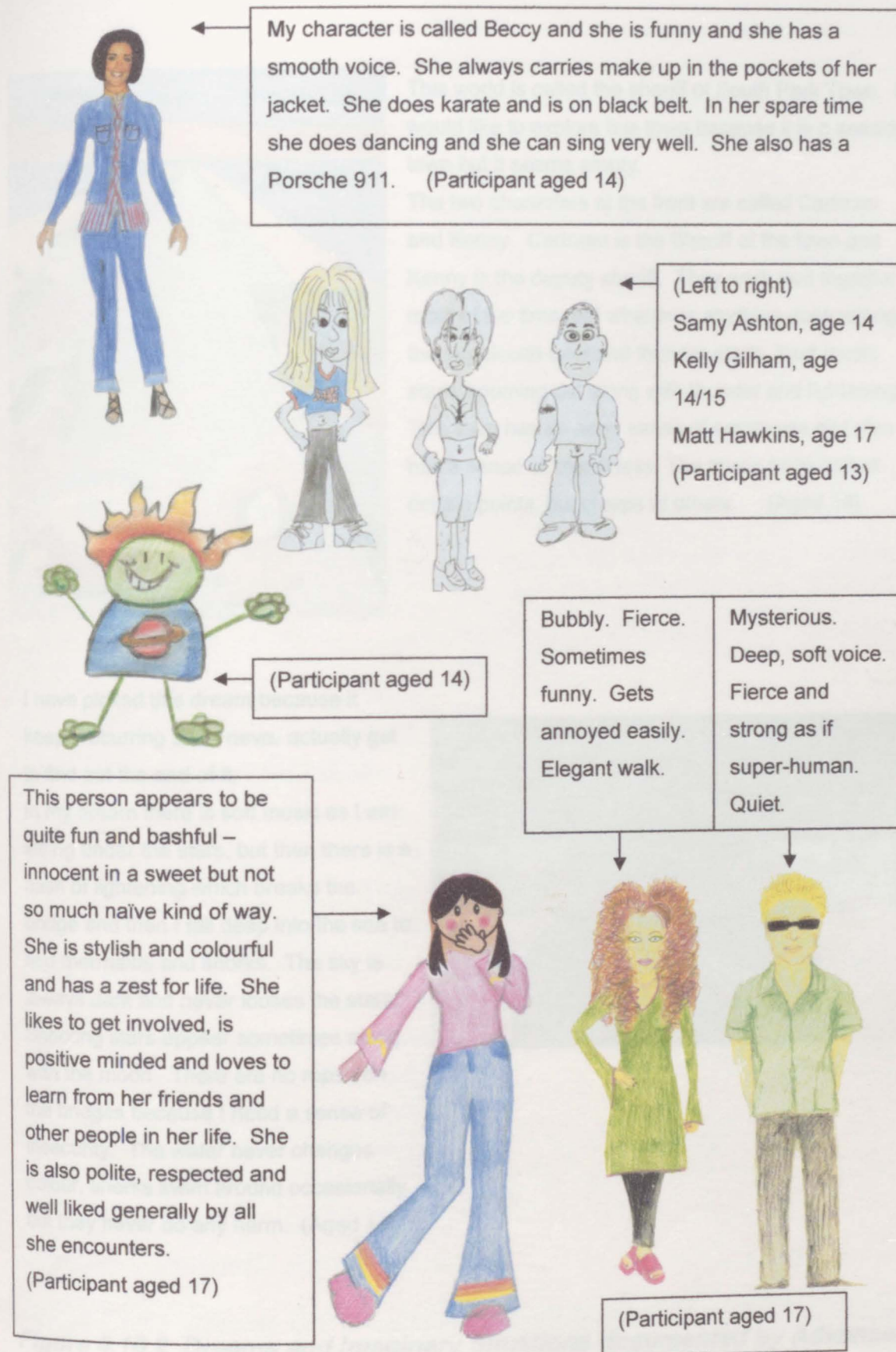
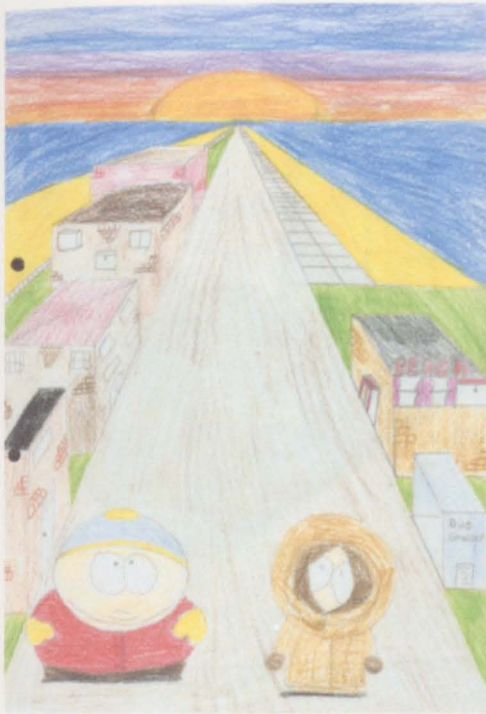


Figure 4.10.1 Characters for Software Game created by Advanced Focus Group Participants (Females aged 13-19)



This world is called the sheriff of South Park Town. I would like to explore this town because it is a seaside town but it seems empty.

The two characters at the front are called Cartman and Kenny. Cartman is the Sheriff of the town and Kenny is the deputy sheriff. They work well together most of the time, but whenever anything goes wrong the sky clouds over and thunder starts, loud music starts booming out along with thunder and lightening. This town has an eerie sense of emptiness and also has a sense of creepiness. The music turns soft at certain points, but creeps at others. (Aged 14)

I have picked this dream because it keeps recurring and I never actually get to find out the end of it.

In my dream there is soft music as I am sitting under the stars, but then there is a flash of lightening which breaks the bridge and then I fall deep into the sea to find mermaids and snorks. The sky is always dark and never loses the stars. Shooting stars appear sometimes along with the moon. There are no ropes on the bridges because I need a sense of insecurity. The water never changes colour, sharks swim around occasionally but they never do any harm. (Aged 14)

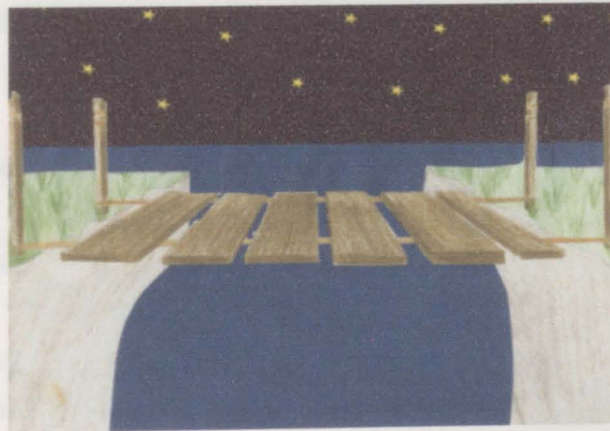
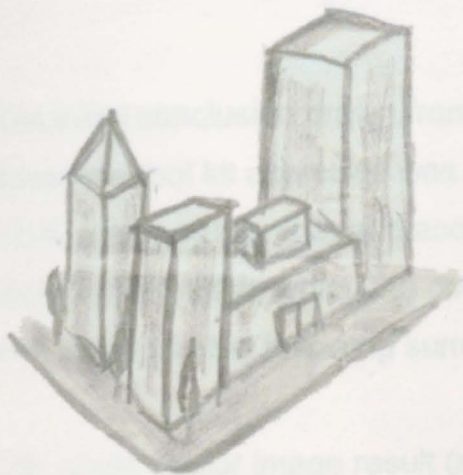


Figure 4.10.2 *Dreams and Imaginary Situations documented by Advanced Focus Group Participants (Females aged 13-19)*



This is a dream and also somewhere I would like to explore with an everyday world feel. I would like to be able to create my own person + car and be able to go shopping in New York on my own. This is because I would be able to explore what NY is actually like, meet people and see how different their lifestyle is to mine. What other different facilities and pleasure activities they do or have. How I would have to cope in a totally different place. Once I was in NY I would like to be able to go shopping and see how different the shops are. I would like to be able to sight-see the different buildings and places. I imagine big famous colourful shops, bright colours and always a nice bright sunny cheerful day. Busy roads and streets filled with weird and cartoon looking cars. Cartoon characters in the shops but all fun and colourful things. At night I would love to go hunting for nightclubs, so I can meet people. (Aged 15)

I would like to go and explore Ibiza with my friends. We would go to the clubs at night. The clubs would be crowded + warm + tightly packed with lots of people. There would be a wide variety of different people that we would meet + chat to. The clubs would have live acts on stage. Outside the club it would be noisy but cool. The sky would be getting light, be a mixture of grey, red + orange when the sun was rising, just when we would be getting home. During the day we would go to the beach, which would be packed with tourists. The sea + sky meet and you can't really see where. The sand is warm from the sun + the sea is a rich blue. (Aged 14)

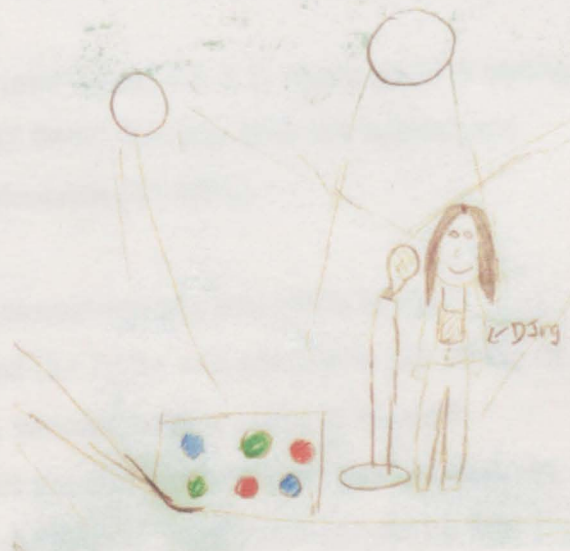


Figure 4.10.3 Dreams and Imaginary Situations documented by Advanced Focus Group Participants (Females aged 13-19)

4.11 Conclusions & Analysis of User Behaviour Study and Advanced Tool Kit Exercises.

The initial conclusion drawn from observation of the process and results of the advanced tool kit exercises was that the colour preferences of the females aged 13-19 under study, changed according to the context of the subject or environment within which the colours or images were applied. This conclusion is illustrated in the following summary:

The single colour image result (see figure 4.8.1.2) shows a strong preference for the soft/cool quadrant of the colour image scale (41.57%). The most popular choice for a single colour was *salvia blue* and the second most popular single colour chosen was *lavender*.

The image word exercise results (see figure 4.8.2.1), in contrast, showed a shift in preference towards the soft/warm quadrant of the scale (35.96%).

The 5 colour combination preferences (see figure 4.8.3.1) again show a strong tendency for the soft/warm quadrant (37.04%), but this time the warm/hard quadrant followed as close second preference (31.48%).

Fashion colour image preferences fall almost equally into three of the quadrants; soft/cool (31.71%), cool/hard (31.71%) and soft/warm (29.27%). It is interesting that the cool/hard quadrant, which contains most of the dark combinations, becomes one of the most popular selections in this context. In relation to clothing, this is perhaps not surprising. That there should be this almost equal pattern of preference for three quite different colour palettes, however, illustrates the range of colours that is associated with 'fashion image' and its transient dynamism.

Figure 4.11.1. Summary of Colour Image Scale Results
(Advanced Focus Groups - Females aged 13-19)

The preferred selections for images of chairs and furniture also fell predominantly into the soft/warm quadrant (42.86%), with the cool/hard quadrant receiving 32.14%, the soft/cool quadrant 14.29% and the warm/hard quadrant 10.71% (see figure 4.8.5.1). Further results of object and environment images are illustrated in figures 4.8.6.1 and 4.8.6.2, where preferences for window displays and building façade and cityscapes were collected. These two exercises revealed a preference for the soft/cool quadrant (54.17%) with regard to objects in window displays and a preference for the cool/hard quadrant (32.14%) in the selection of images of buildings and cityscapes.

All of these specific context colour preferences revealed by the focus group participants provide interesting and useful material for a designer to begin to picture the colour attributes for particular areas of development that would be potentially more appealing in the design of leisure software for this target user group. A summary of the results in illustrative form is provided in figure 4.11.1.

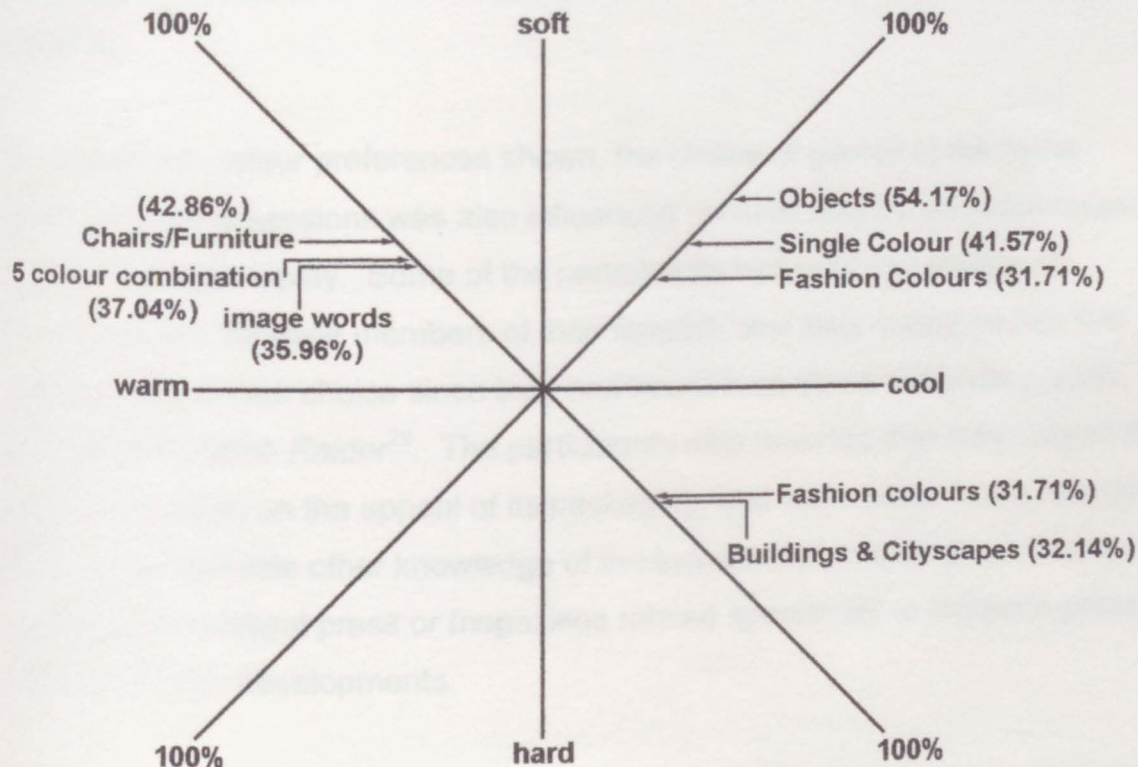


Figure 4.11.1. Summary of Colour Image Scale Results
(Advanced Focus Groups – Females aged 13-19)

All of the contexts would clearly be useful for the design development phase within the detailed design of environment or characters for a leisure software product. Some of the contexts, for example, the image words and the 5-colour combination preferences might also be useful in the development of publicity and marketing material. When compared with the quadrant positions of the games offered to the focus groups (see figure 4.9.1), it is interesting to note that although just over half (11 of 21) of the games offered fell into the warm/soft quadrant which was the most popular for the image words, 5 colour combination and for chairs and furniture; there was a distinct lack of games, in fact only 4, that fell into the soft/cool quadrant. This illustrated that there was more potential for products to be developed that focused on colour palettes from this quadrant, particularly since the single colour image preference was located here. It was perhaps surprising that the most popular single colour preference for the female 13-19 focus groups was blue, not usually a colour associated with girls, but obviously, from these results, one which should be explored further and regularly monitored to observe any variations over time and dynamic cultural influence.

As well as the colour preferences shown, the choice of games in the focus group gameplay sessions was also influenced considerably by potential content and mode of gameplay. Some of the participants had prior knowledge of certain games via male members of their families, and they indicated that this had influenced their choice since they had heard a lot about particular games, for example, *Tomb Raider*²⁹. The participants also reported that they judged the game very much on the appeal of its packaging, and what content was reflected by it. They had little other knowledge of the individual products, since they did not read the relevant press or magazines related specifically to software games and technology developments.

It should be noted that, after the initial questionnaire results had been presented to the publisher, certain marketing recommendations were made (see section 4.4.3) and an advertising campaign for *The Sims* was initiated in two of the

identified magazines³⁰ rated as the most popular, at the time, by the target group. Quite a few of the girls who took part in the focus group sessions stated that they had seen these advertisements. They had been interested in the product because of the publicity, but only one had been able to try the game itself. They were therefore all very keen to try this particular product and reported that the packaging and publicity revealed what appeared to be very interesting game content.

4.12 Stage 3: Product Development Proposals

The product proposals were developed in conjunction with individuals from the target user group. As previously noted, one of the advanced focus groups took place outside of school hours and in an informal setting. This particular group contained four participants, one aged 13, two aged 14 and one aged 17. One of the participants expressed a slight reservation about software games and the other three were already frequent players. Two of the participants had a strong interest in art and design and were very keen to be involved in the design proposal activity.

The participants at this stage had already completed questionnaires and both the tool kit and the advanced tool kit exercises in addition to one or several game play sessions. Two further sessions then focused on game concept generation based on the results obtained from all of the focus groups. These participant stakeholders proved to be essential in the translation of results into detailed product proposals due to their understanding and cultural sensitivity of the material under discussion.

Five product development proposals were therefore presented back to the publisher, the first one being the *Play Concept Generation Technique* itself:

4.12.1 Product Development Proposal 1: Play Concept Generation Technique

This proposal was not specifically generated with the user group. Initially, relevant research on psychology and design methodologies was taken into consideration. This research was continually monitored and updated throughout the process. Existing research and information was utilised and importantly, it was established that few methods or processes had been developed to assist the design process for leisure software products. Crucially, no evidence could be found of methods to enable or assist the production of relevant concepts for new leisure software product development.

As documented throughout this chapter the technique began with a questionnaire survey and progressed through a process of inductive and deductive analysis and generative research, developing tools to allow constant comparison, conjoint analysis, bivariate and multivariate analysis and cluster analysis. All of these methods were utilised to examine the attributes contributing to the overall content and aesthetic design of concepts for software game play. The Tool Kit technique was derived out of the initial survey results and the literature review, so although there was no direct input from the user group, it was their responses which were then investigated further and subjected to constant comparison, analysis and reflection in relation to existing and emerging research and design methodologies relevant to the subject.

A summary of the technique for the target group of females aged 13-19 is given in figure 4.12.1, but it should be noted that this technique would vary in relation to the target group specified. For different target groups the Preliminary Tool Kit stage would be the same, but there may be some variation in what was studied at the Advanced Tool Kit stage, as this would depend on the results from the questionnaire survey and the Preliminary Tool Kit relevant to each specific target audience.

Leisure Software: Play Concept Generation Technique (Females aged 13-19)		
1.	Questionnaire	
2.	Preliminary Tool Kit	1. Play Motivators 2. Play Environment Attributes 3. Play Character Attributes
3.	Advanced Tool Kit	For example: Colour & Image Analysis <ol style="list-style-type: none"> 1. Single Colour 2. Image Words 3. 5 Colour Combination 4. Fashion Colour Image 5. Chairs / Furniture 6. a) Objects b) Buildings / Cityscapes 7. Abstract, Natural & Geometric Forms
4.	Current Product Evaluation	1. Game Selection 2. Game Play Observation Session(s) 3. Game Comment Sheet(s)
5.	Create & Explore Session	1. Character(s) 2. Dream(s) / Imaginary Game Situation
6.	User Stakeholder Concept Generation Session(s)	Repeat process at more detailed level using diagrammatic and visual and descriptive written methods. Use paper and 3D model prototyping.

Figure 4.12.1 Product Development Proposal 1
Leisure Software: Play Concept Generation Technique
 (Females aged 13-19)

4.12.2 Product Development Proposal 2: Leisure Software Concept 1 – Play Chooser & Classification Model

It was observed during the initial fieldwork and subsequently during the focus group game play sessions, that for most users considering purchasing leisure software, the packaging and retail display were the only source of information on a particular product. Certainly very few consumers outside of the core game user group were well informed about new products or those in development.

The second proposal for product development therefore focused on how an end user could choose a game product in another way. Play motivators had already been studied in the focus group sessions and it was decided that these intrinsic motivators could also provide a starting point for a *Play Chooser* that would allow potential users to select the kind of play they wanted rather than relying on the graphical presentation of products which may or may not provide the content or the kind of play that the user was seeking.

The *Play Chooser* needed to represent all of a play's possible motivators, and be presented via a simple interface easily navigated by both experienced and new users. The *eight* motivators that formed part of the initial tool kit were reconsidered at this point to see whether their meanings could still be retained within a reduced number of headings. The original motivators were: *Survive, create, explore, participate, nurture, learn, control and win*. Figure 4.6.1.2, earlier in this chapter illustrates the Tool Kit Results from the females aged 13-19 in relation to their first, second and third choice game play motivators. When the total of all three choices is added for each motivator, the following results emerge (note that they are plotted in order of popularity on this occasion in order to observe which motivators occur as the most frequently chosen):

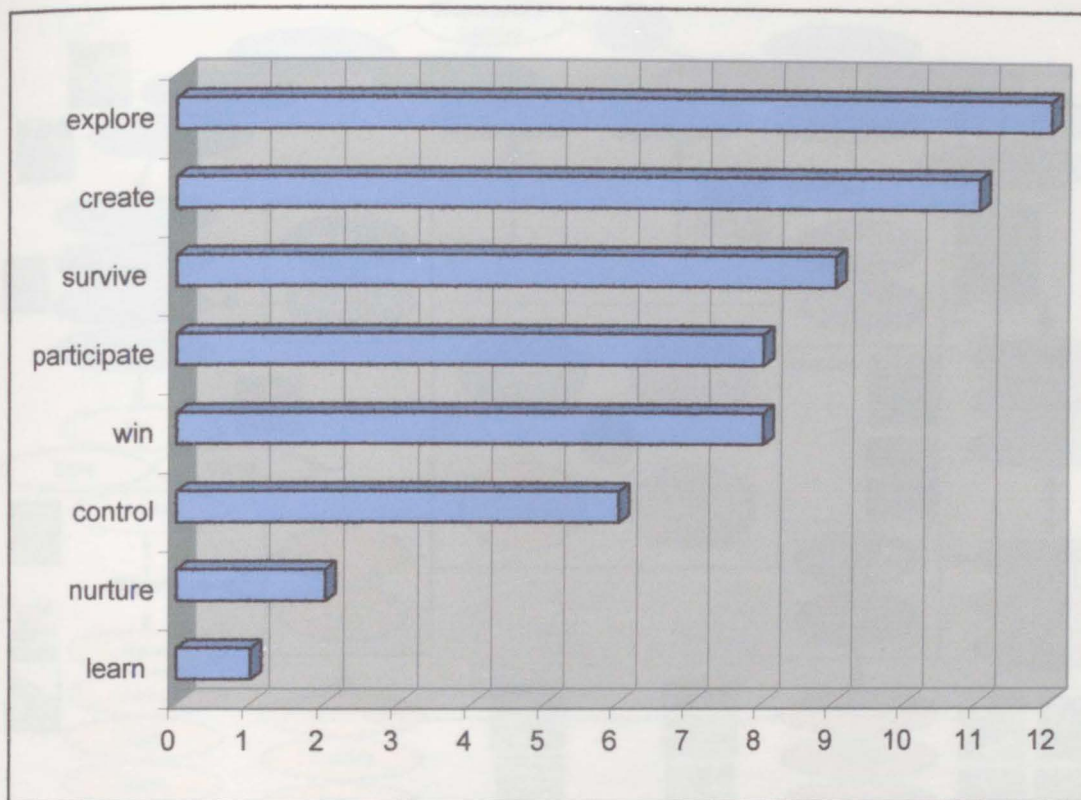


Figure 4.12.2.1 Totals of 1st, 2nd & 3rd choice Play Motivators (Females aged 13-19)

After considerable reflection, it was decided to reduce these 8 motivators to just 4; *explore*, *create*, *survive* and *challenge*. It was felt that these four motivators allowed for all the original motivators to be included within their definitions.

Challenge was adopted in order to reflect the popularity of *win* and *participate* as well as *learn* and *control*. *Nurture* could be reflected as elements of a *survive* or *create* option, and *learn* could be represented within *create* or *challenge*.

Reducing the motivators to four meant that a simple interface could be created that would allow a user to choose from a reduced set of options. The design proposal model (illustrated in figure 4.12.2.2 and in the accompanying portfolio) would then offer subsequent choice of game play content and would finally link the player to a game product that contained the user's individual choices. The *Play Chooser* could easily be developed as a stand-alone piece of software, but would ideally be most useful as an on-line interactive system, which could also record and classify user choices in order to identify changing patterns in user preferences for further research, development and marketing use.

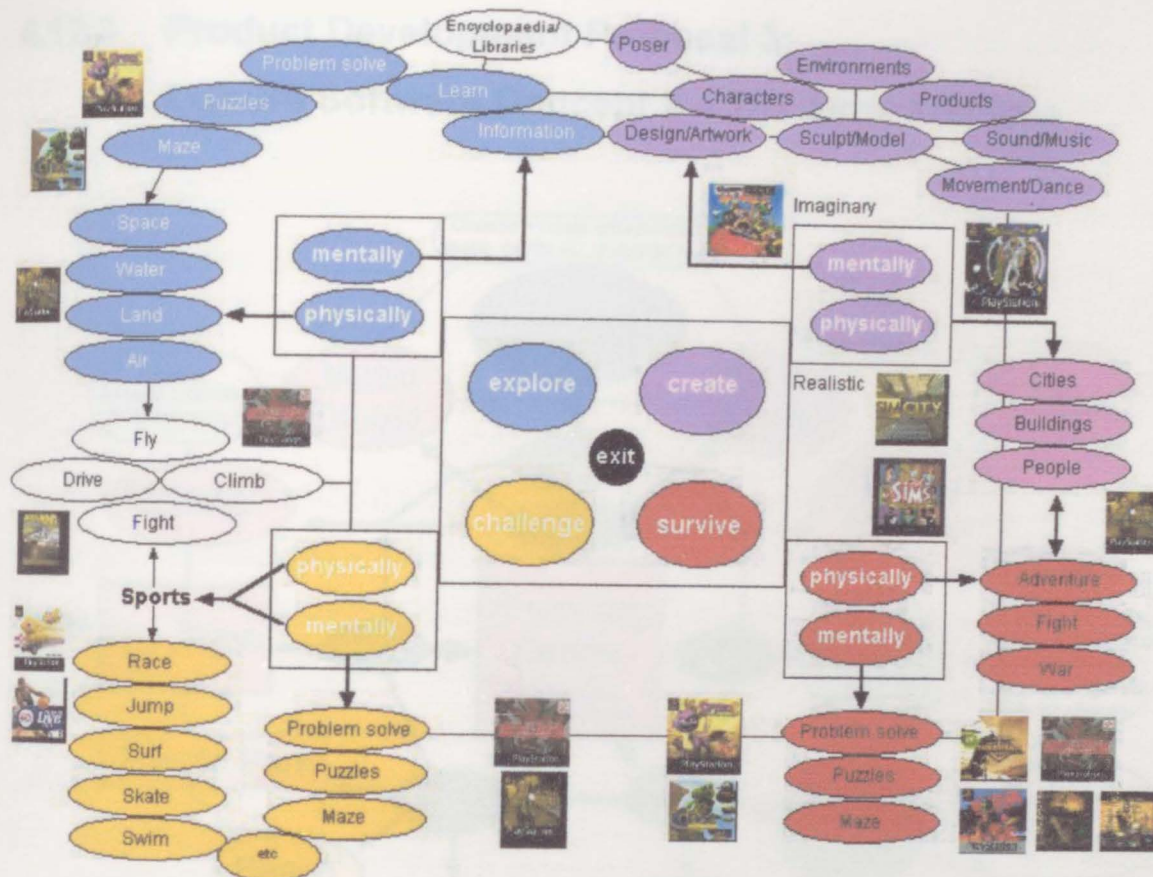


Figure 4.12.2 Product Development Proposal 2
Leisure Software Concept 1: Play Chooser & Classification Model

This classification technique would allow games to be positioned in more than one area if their content fell into more than one zone of the model. It would also enable user chosen games to be mapped onto the model (in either a visual three-dimensional method or a numerical count) **over a period of time** and thus identify areas on the model which were either popular or which had few games in them and therefore did not provide any games that could be chosen. The technique's dual purpose would therefore allow for this recording and classification procedure to be enabled alongside it's main purpose; to allow users to choose a game via a more intrinsic psychological method rather than by the current method of simple guess selection from the products available on the shelves in retail stores or presented in online displays where they are arranged by game 'genre' or promoted because they are the most recent release or the most popular game already.

4.12.3 Product Development Proposal 3:

Leisure Software Concept 2 – *The Sims* Add Ons

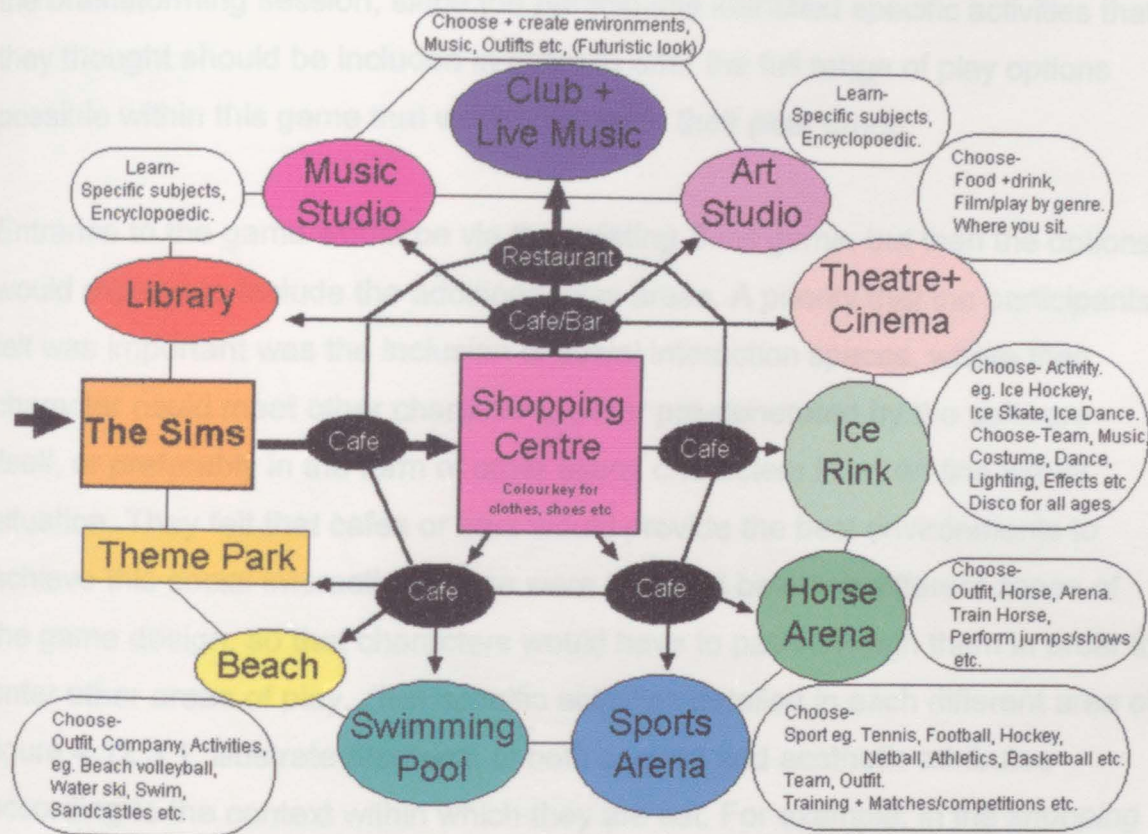


Figure 4.12.3.1 Product Development Proposal 3
Leisure Software Concept 2: *The Sims* Add Ons
(Females aged 13-19)

The third product development proposal was derived directly from user feedback during the focus group sessions. The concept generation sessions in particular identified a stakeholder desire to expand *The Sims* game that had already been identified as the most popular choice from those offered to the focus groups. The participant stakeholders suggested that this particular game was too restricted in its range of activities and that there were lots of other areas in which they would like to see the concept developed. A brainstorming session soon revealed all of the contexts and environments that they considered to be relevant to them and their peer group. Figure 4.12.3.1 illustrates, in diagrammatic form, those suggestions put forward by the participants.

It is interesting to observe the similarity between the areas identified and the results of the questionnaire survey regarding personal and leisure interests of this user group (see figure 4.4.2.5 for comparison). Detailed notes were taken during the brainstorming session, since the participants identified specific activities that they thought should be included in order to offer the full range of play options possible within this game that would appeal to their peer group.

Entrance to the game would be via the existing *Sims* game, but then the options would expand to include the additional play areas. A priority that the participants felt was important was the inclusion of social interaction spaces, where their character could meet other characters, either pre-generated by the software itself, or preferably in the form of other users' characters in an on-line virtual situation. They felt that cafes or bars would provide the best environments to achieve this social interaction; these were included between different zones of the game design, so that characters would have to pass through them in order to enter other areas of play. The specific activities detailed in each different area of figure 4.12.3.1, illustrate elements of both content and aesthetic attributes according to the context within which they are set. For example, in the *shopping centre* area (central in the diagram), the participants suggested that there could be a colour-coded system to identify different kinds of items that could be selected. The emphasis within this area was clearly on creating the 'right' look for the character, in the forms of clothing and accessories. This request was repeated in several other areas including, the club and live music area, the beach area and the sports arenas. In addition, the participants requested the ability to create and adjust elements of the environments within some of the areas, particularly the club and live music area and the ice rink / disco area.

This particular proposal was received by the publishing company very well. A representative fed back the stakeholder proposals to the design studio for *The Sims* design team to consider. Subsequently, a series of add-on packs for the game were released, which did bear a close resemblance to some of the areas identified in the proposal³¹.

4.12.4 Product Development Proposal 4:

Leisure Software Concept 3 – Portable / PC Original

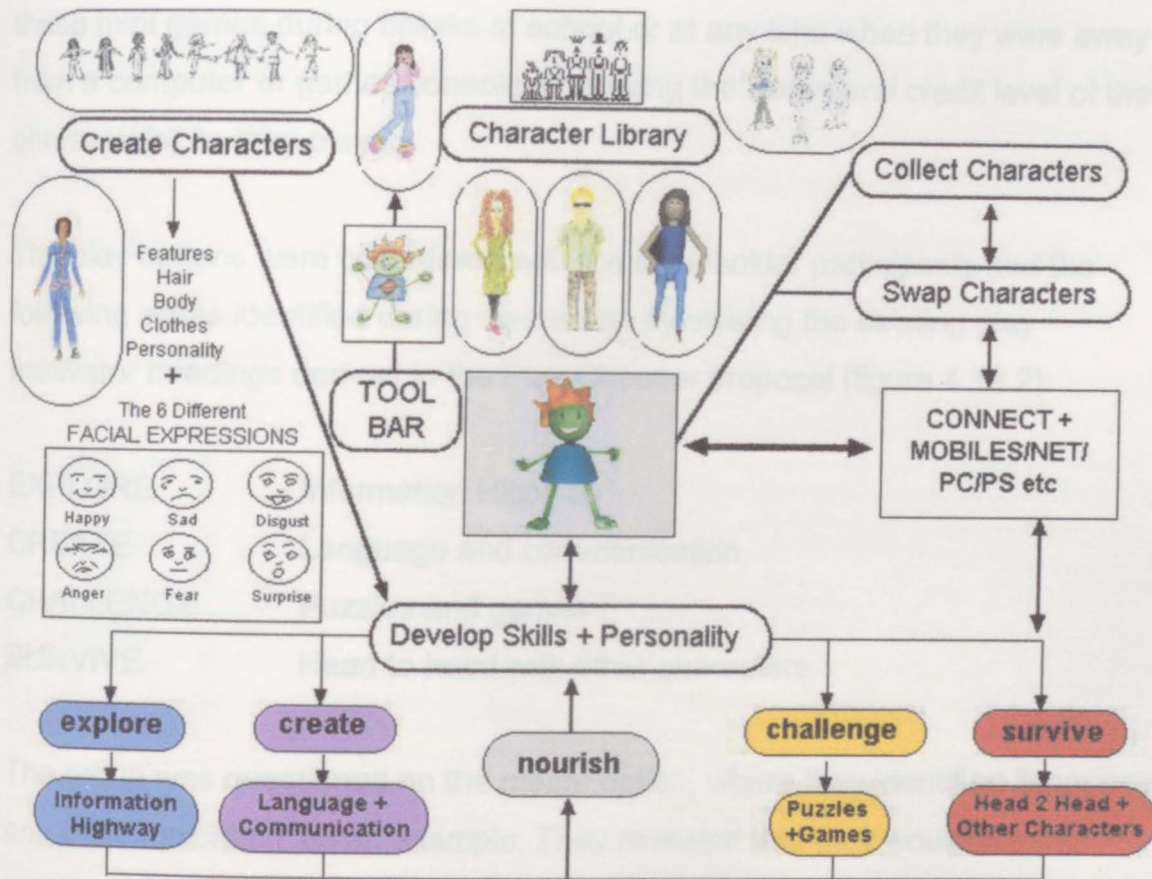


Figure 4.12.4.1 Product Development Proposal 4
Leisure Software Concept 3: Portable / PC Original
(Females aged 13-19)

The fourth proposal focused on a potentially portable original game concept, where the user could develop a character or characters that they had created and connect this character back into a larger PC or console based game. The focus group looked at possibilities within this area for elements of character based play that would appeal to them and their peer group. Figure 4.12.4.1 illustrates the architecture of this concept in diagrammatic form. Central to the concept is the creation or selection of the user's character. The participants also suggested that they would want to 'collect' and be able to swap different characters via connection to mobile phones, personal computers, game

consoles and the Internet. They suggested that the user should be able to play mini games on a portable device that would develop the characters' skills and personality, so that when reloaded into a game on a computer or console, the character would have increased its position. This would allow them to play these mini games during breaks at school or at any time when they were away from a computer or games console, improving the status and credit level of their character(s) as they played.

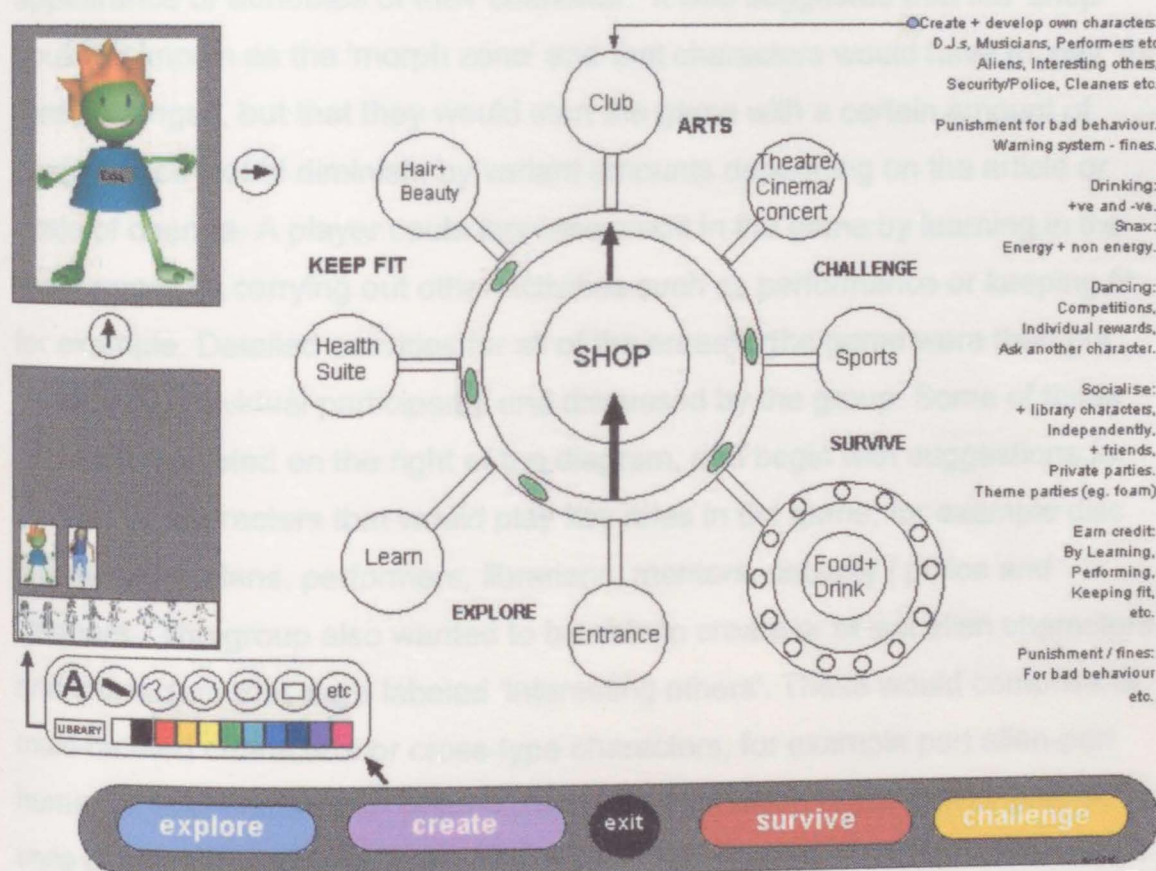
The play options were considered with the stakeholder participants and the following areas identified during discussion by utilising the existing play motivator headings derived in the Play Chooser proposal (figure 4.12.2):

EXPLORE	Information Highway
CREATE	Language and communication
CHALLENGE	Puzzles and games
SURVIVE	Head to head with other characters

The group was questioned on the *create* option, where they identified 'language and communication' as an example. They revealed that they would want to create a universal language or communication method that would be unique to the game. It was suggested to them that the six universal facial expressions identified by Ekman et al (1972) and Ekman and Friesen (1975) could be potentially utilised in this context. This idea was considered to be desirable by the participants since they felt it would help to instantly recognise and identify the emotions of a character at any particular time and therefore offer additional feedback to the game player on their progress with their character or the reactions of other characters to the actions or attentions of another. The six facial expressions are detailed in figure 4.12.4.1; happiness, disgust, surprise, sadness, anger and fear. It is therefore proposed that these expressions represent emotions and could be programmed into the game characters.

4.12.5 Product Development Proposal 5: Leisure Software Concept 4 Original Concept - GAIA / Virtual Contax

As stated previously, leisure software concept 3 was intended to link to a larger game either on a personal computer or a games console. The characters' development, status and credit would then be transferred from the portable console's memory into the main game. The final product development proposal detailed in figure 4.12.5.1 below, exemplifies the kind of larger game that the concept generation focus group detailed.



**Figure 4.12.5.1 Product Development Proposal 5
Leisure Software Concept 4: (Females aged 13-19)
Original Concept – GAIA / Virtual Contax**

The main route through the game was proposed by the user stakeholder group as being through the 'shop' to the 'club'. The 'club' was seen as the social playground. The focus group described how they would love to go to nightclubs themselves, but since most of them were not old enough, found this social activity barred to them in real life. However, they felt that a game that could begin to give them some experience of this environment would help to prepare them for what to expect and how best to behave. The 'shop' was described as being somewhere users could alter their character. The group discussed how the 'shop' might be arranged and after lengthy deliberation decided that 'virtual changing booths' would best suit their design concept. These 'changing booths' would enable characters to enter and view themselves while changing either the appearance or attributes of their character. It was suggested that the 'shop' could be known as the 'morph zone' and that characters would have to 'pay' for these changes, but that they would start the game with a certain amount of credit, which would diminish, by variant amounts depending on the article or scale of change. A player could increase credit in the game by learning in the 'learn zone', or carrying out other activities such as performance or keeping fit for example. Detailed activities for all of the areas in the game were then put forward by individual participants and discussed by the group. Some of these activities are listed on the right of the diagram, and begin with suggestions for the kind of characters that would play key roles in the game, for example disc jockeys, musicians, performers, librarians, mentors, security / police and cleaners. The group also wanted to be able to create or select alien characters and characters that were labeled 'interesting others'. These would comprise of multi-faceted characters or cross-type characters, for example part alien-part human or part human-part animal creatures, in addition to cartoon or graphic style character representations. All characters would be programmed with the six different facial expressions relating to emotions as described in Product Development Proposal 4 (figure 4.12.4.1).

Credit could be earned by developing a character that could complete or do well at various activities, for example carrying out a particularly good DJ session in

the club, performing a brilliant piece of music in the concert hall, winning dancing competitions or simply getting rewarded for individual development. It was also decided by the group that it was important to have punishment for 'bad' behaviour, including a warning system and fines, either by removing credit or by imposing a socially beneficial activity on the character, such as cleaning or a rigorous working routine.

The concept of what comprised 'good' and 'bad' behaviour was debated by the group, but it was decided that this would really need to be discussed in detail at a later stage of development when other stakeholders in the product (for example the publisher and studio) could be included, in order that they could input their views on acceptable content and ethical limitations. When asked further about their reasoning for having a punishment system, the group revealed that it would be good in the game to be able to 'experiment' with virtual forms of nourishment and specified alcohol and drugs as being substances that they felt their peer group was interested in finding out about. They articulated that they felt if people could see what happened to a virtual character that overindulged, that they would be more aware of the consequences of these substances in real life. The group were aware that this could be a potentially difficult subject for software game producers to tackle, so they suggested it could work in a similar manner to the 'virtual changing booths'; there could be 'recharge booths' that would distribute positive and negative energy drinks (alcoholic and non-alcoholic) and 'snax' (energy boosting and non-energy). If a character took too much of the wrong sort of nourishment, or didn't attend to their nourishment regularly, or in a balanced way, then they would potentially 'pass out' and have to start the game again, with a fine or punishment of course! Good behaviour within the game would be rewarded with credit, for example positive socialising with other characters, either independently or with friends. A particular request from the concept generation focus group was that they wanted to be able to have 'private live on-line parties'. This scenario was envisaged as taking place in a private area of the game, where the user would be able to design or select an environment that would only allow access to

particular friends and their virtual characters. They would specify an *interaction time* for this event to take place and then they could have their own 'virtual club' evening with their real-world friends, who would also be at home interacting through technology, too young to actively participate in real night-time socialising. The group also suggested that 'themed' parties could attract groups together on-line, or be a part of the private party scenarios. Limited examples were given (foam parties and 60's & 70's parties), but it is certain that a design team could come up with a lot more suggestions in this area.

Figure 4.12.5.1 illustrates the main concept content of the game desired by the focus group participants. The detailed content for each area would obviously need to be established further, but the group's suggestions went a long way towards resolving further development. Activities already detailed in Product Development Proposal 3 (figure 4.12.3.1) were also specified as being relevant by the group for the sports, arts, learn and keep fit areas of this game. It was also suggested that the keep fit zone could contain beach and jungle areas where characters could relax or explore. It was suggested that the keep fit area should be seen as an additional 'nourish' area, since this activity was seen as being as important as nourishment in the form of 'drinx' or 'snax' (terms adopted by the focus group). It was decided that this keeping fit was about 'nurturing' a character. The 'learn zone' could contain encyclopedic information, puzzles, mazes, quiz areas, and would be an area where characters could 'learn and earn' to increase credit within the game and their characters status and knowledge both within and outside of the game.

The concept proposal was obviously vast, yet needed a simple interface through which to navigate around the game. The concept content was modeled in 3D software in order to visualize how it might appear as a leisure software product. Each of the different activity areas was represented by a particular shape which could be used to identify the area throughout game navigation. Figure 4.12.5.2 shows the location of the different activity zones in a plan view of the 3D model.

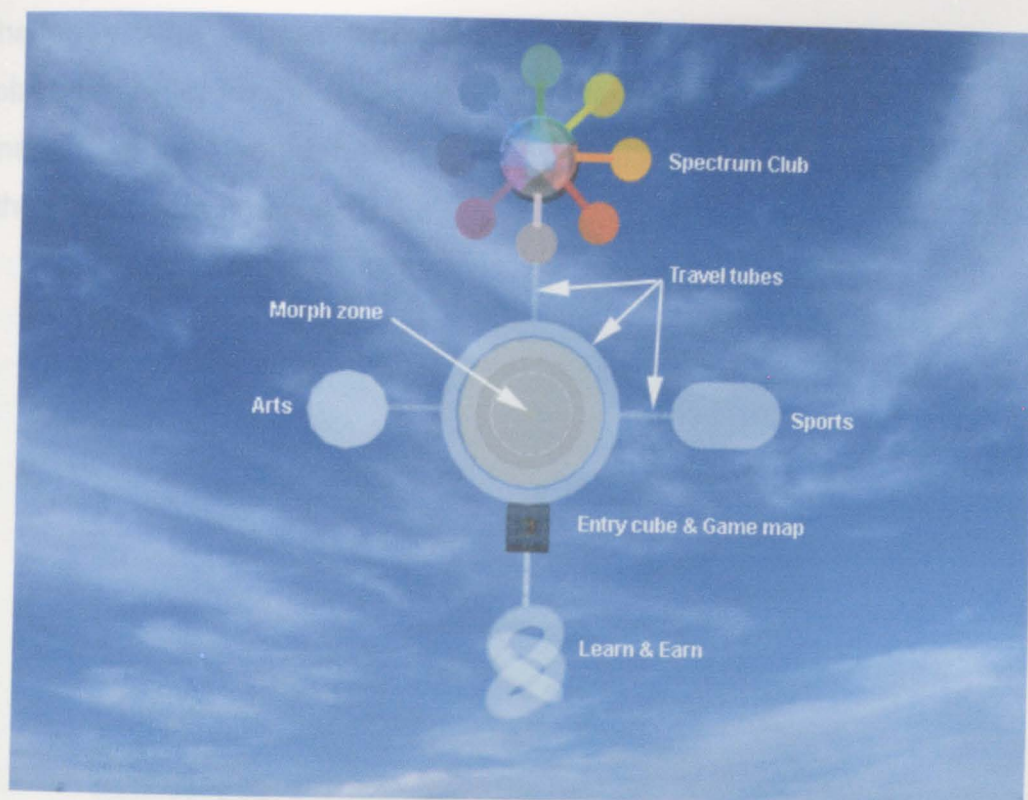


Figure 4.12.5.2 Location of activity areas within 3D model of
Product Development Proposal 5
Original Concept – GAIA / Virtual Contax

Initial entry would be via a 'freefall' through space motion sequence after which the player would arrive at the entry cube.

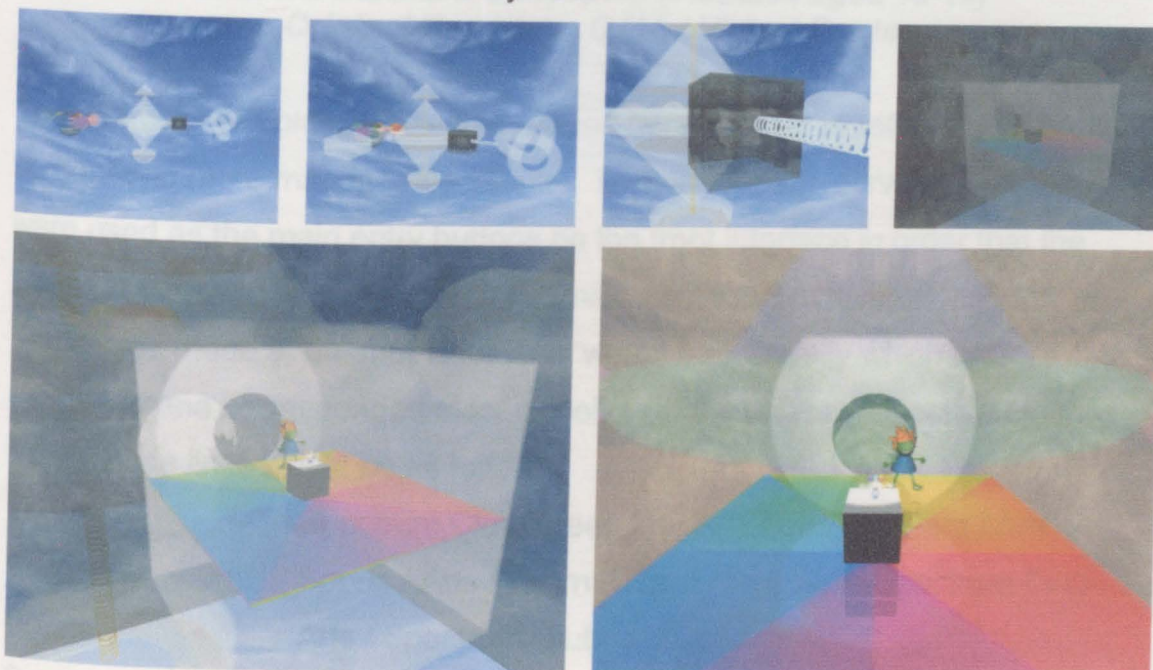


Figure 4.12.5.3 Storyboard of animated sequence to entry cube

In the 'entry cube' a three dimensional replica of the entire model would be displayed in order for the user to orientate themselves and observe the play arena. The player would then be asked to make a selection from the choices on the interface in figure 4.12.5.4.

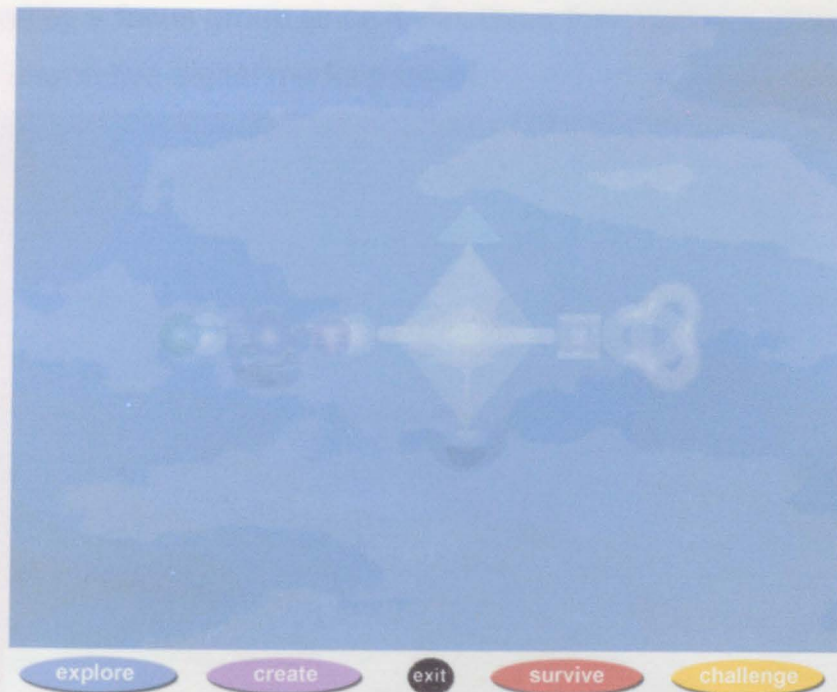


Figure 4.12.5.4 Motivator Interface Design
Product Development Proposal 5
Leisure Software Concept 4: (Females aged 13-19)
Original Concept – GAIA / Virtual Contax

The motivators to play were again utilised here in order to refine the concept content into more manageable chunks. Explore, create, survive and challenge were used as the main entry buttons on the front interface in order that the player could select a psychological game objective or motivator.

The choice made at the motivator level would then identify which areas within the play arena corresponded most closely with the player's objective. In most cases those links would be as follows:

Explore	Spectrum Club / Keep Fit / Arts / Learn & Earn / Arts
Challenge	Sports / Arts / Learn & Earn / Keep Fit / Spectrum Club
Create	Arts / Spectrum Club
Survive	Learn & Earn / Sports / Spectrum Club

The areas of play listed above, are located in the three dimensional model and would light up to identify which areas of the game contained the objective that had been selected by the player. The model simplifies the concept content of figure 4.12.5.1 into a 3D *concept prototype model* which can be more easily understood by a focus group since it visualises their idea in a similar way to a finished interactive digital media product.

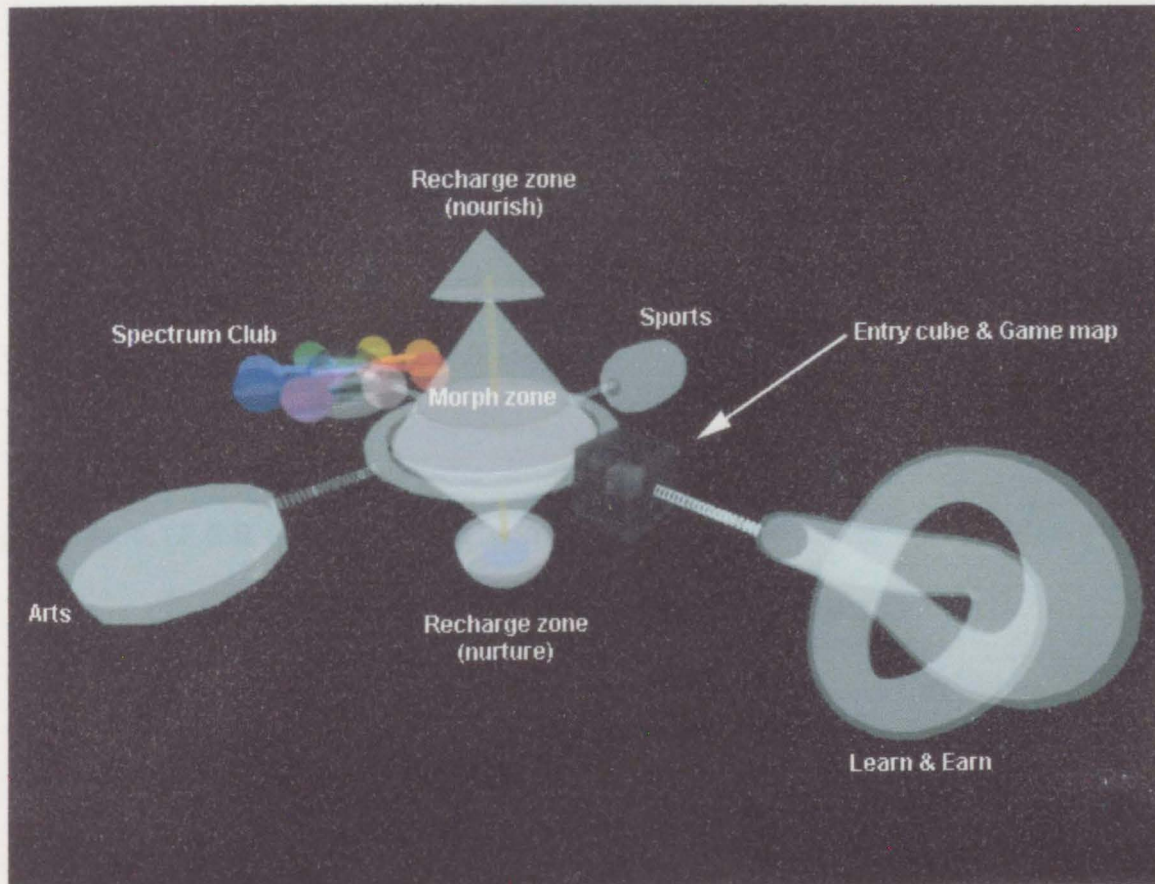


Figure 4.12.5.5 *Render of 3D concept prototype model*
Product Development Proposal 5
Leisure Software Concept 4: (Females aged 13-19)
Original Concept – GAIA / Virtual Contax

The player would then select an area of the model in which they wanted to begin play and this would identify the initial direction of travel for the character. Next, the player would be instructed to proceed through the hole in the entry cube (shown in the last two illustrations of the storyboarded animated sequence of figure 4.12.5.3) to the 'morph zone' where they would select or create their character in one of the 'virtual changing booths' as described previously in this

section. This character would then travel throughout the play arenas via 'travel tubes' that would connect the different areas of play. The central component of the 3D model, the 'morph zone', resembles a gyroscope and has a travel tube located around its central diameter.

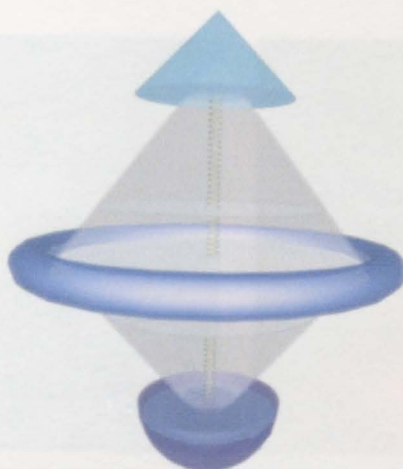


Figure 4.12.5.6 'Morph zone' showing upper and lower 'recharge zones'
Product Development Proposal 5
Leisure Software Concept 4: (Females aged 13-19)
Original Concept – GAIA / Virtual Contax

The other areas of play link to this. A vertical 'travel tube' runs through the centre of the 'morph zone' and links upward to a 'recharge zone' for nourishment ('drinx & snax') and downward to a 'recharge zone' for nurturing (keep fit). There would also be the option for players to create further environments themselves, as they progress and develop. These extra modules would link to the original model via transport tubes. Further 'recharge zones' and other items could also be added from a library of environmental features. Another feature that would be added after progression to a certain level would be the option to 'freeflow' travel around in a character's own 'capsule'. This form of travel would not require the player to stick to the routes of the 'travel tubes'. Sketches of the development of this concept are detailed in Appendix 4.1 and further rendered images from the 3D concept prototype model in Appendix 4.2 (and in the accompanying portfolio). A few are shown below in

figure 4.12.5.7. Those shown also demonstrate a further important factor of environment that the focus group felt was important to include; the element of time passing. They suggested that different times of the day and night (and seasons) should be reflected in the environmental attributes.



Figure 4.12.5.7 Rendered scenes from the 3D concept prototype model
Product Development Proposal 5
Leisure Software Concept 4: (Females aged 13-19)
Original Concept – GAIA / Virtual Contax

It is not within the scope of this study to document all of the detailed design development that took place on this concept after the input from the concept generation focus group sessions. However, the 3D model and accompanying sketches and design notes were presented back to the focus group in a final session to observe their responses to the concept idea and its execution in the form described above. The feedback was very positive. All four participants agreed that the idea looked very interesting and that they would be keen to play it if it were available. Their next question was; "How soon will we be able to buy this in the shops?"

Clearly, the concept would need a lot of further development before it could be released as a finished leisure software product, but the input of the concept generation focus group could crucially benefit this process. Continual discussion throughout any further design development, with small groups from the target user group would identify and innovate areas of a product that the designers, if left in isolation, may not consider. Equally, it would identify problem areas that the user group felt would not work with their peers.

Clearly, with this particular user group, the concept generation technique involving user stakeholders did help to generate clear and detailed concept ideas for development. A full evaluation of the technique is documented in section 4.15, later in this chapter, after the next section, which tests the Play Concept Generation Technique with both student designers and a different target user group.

4.13 Testing the Play Concept Generation Technique

4.13.1 Design Experiment

It was decided that additional testing of the Play Concept Generation Technique would be necessary to ascertain whether it was useful to the designer in the process of concept generation for a specific user group. A design experiment was carried out with three design teams made up of two student designers each. These students were in the first year of a Digital 3D Design degree course and all had an active interest in digital design, although not all were specifically hoping to enter a career in the design of interactive digital media. The experiment to test the Play Concept Generation Technique was carried out under controlled conditions which restricted communication between the participant design groups so that each group did not know how the other groups were working, or what information or tools they had been given. No computer access was allowed during the experiment and the movement of the teams was restricted to keep them separate from each other. The teams' design activity was also time limited. The briefings and access to the target group had to be staggered, which meant that there was only sufficient time in one day to allow four hours actual concept design time to each team.

The purpose of the experiment was to establish whether the method used by the design teams to generate a software game concept for a specific user group would affect the likelihood of that concept appealing to that same target group.

The three teams were given different methods by which to design a software game concept in order that a comparison could be made of their results:

Team A	No method was specified
Team B	Existing software and product development methods
Team C	Proposed Play Concept Generation Technique

It was decided that a target user group should be selected that would comprise users that were very different from the design students themselves. It was an intention of the proposed Play Concept Generation Technique that it should aid designers in precisely this situation (that the majority of software games are designed for the designers themselves, has already been identified and discussed in earlier chapters). A target user group within the college, that the design students could easily access if they wished to do so during the design process, was identified as the library staff, who ranged in age from 25-50 years.

The design students were not informed of the target group until their individual group briefings and then they were simply told that the library staff fitted the user group description and were accessible, for a time, during the experiment. The written design brief was to

Design a game concept aimed at users in the age range 25-50 years.

The design briefs for each team differed only in the design method and resources provided. Appendices 5.1-5.3 detail the briefs and design methods, reference materials and tool kits handed out during the experiment to the three design teams. The day's events were documented by video and photography during the experiment. Notes were taken where necessary on the progress of the teams by a supervisor / art director attached to each team. The design students were informed that they could seek advice from this supervisor / art director, but that they should document any advice given.

Additionally, the design students were asked to keep a detailed record of their activities during the design process, including the timing of the activity in addition to its content. They were asked to submit a brief written synopsis of their final concept idea in addition to drawn or diagrammatic information. They were also asked to identify any references or influences on their group's design concept.

Each group was given one hour to access the library (and its staff, the potential target group). As previously stated, during the briefing session, when reading out the purpose of the experiment, it was *verbally* revealed to each group that the library staff fitted the target user group criteria. This was done in order to allow Group A, who were to be given no specific design method to follow, the chance of accessing the target group if they wished to do so. Group A had their briefing first and had access to the library between 11am-12noon. They then had four hours to generate a concept idea. A brief summary of each group's process and concept idea follows;

Group A began with a discussion and brainstorming session (they were not given any method or tools to utilise). After approximately twenty-five minutes they arrived at an idea that they felt would appeal to the user group and proceeded to develop this idea in a detailed way throughout the rest of the allocated time. Their idea centered around the concept of 'celebrity' and detailed a game called 'ICON'

"Icon puts you in the shoes of a wannabe star who is trying to make their name in the cut-throat entertainment industry. The ultimate goal is to reach 'Icon' status, an individual so famous, their name becomes legendary."

Notes made by Group A during the design process are presented in full in appendix 5.4.1. The final concept proposal summary, presented by Group A, including sketches of how the concept would be visualised, is detailed in full in Appendix 5.4.2.

Designer and user feedback, analysis of the results and an evaluation of the design experiment follow in the sections after group B and C's process and concept summaries.

Group B were given diagrams of three existing design methods for software game development. These methods had been either identified or proposed at the Game Developers Conference Europe 2001³² (see Appendix 5.2 for brief and diagrams). The 'publisher driven' method is based on a diagram from *Rapid Development* (McConnell, 1996) but also resembles other depictions of the 'Waterfall Method' or 'Waterfall lifecycle model' of classic software development. (Sommerville, 1992, Preece, 1997:46, 2002:187, Dix, 1997:180) The 'Staged Delivery Process' and the 'Organic Development Process' models given to the design group were known to be fairly commonly used in software game development. In addition, Group B was also given access to two books for reference; Jones (1980) *Design Methods* and Stoll (1999) *Product Design Methods and Practices*.

On reading through the notes made during the design process by Group B and crucially, the notes made by the group's supervisor (Appendix 5.5.1), it became apparent that the group knew they would speak with the target group, but required direction on how to best to carry this out and, after being directed to the reference material available, soon adopt the *Customer Focused Concept Design* method detailed in Stoll (1999, p92). The group then followed the 'Understand→Create→Refine' methodology (detailed in Appendix 5.5.1), and begin to notate a research strategy and a questionnaire for the target group, in order to develop a customer focused concept design. They collected data from the target group and analysed the results based on which games were already being played. They then noted common features of the games listed by the target user group. Six features were identified which were preferred by the target group;

- Clear goal (so one can do other things while playing without losing track of the game), strategy, simple, 'fast games' (since they don't have much time to spend playing), multiplayer facilities and competitions.

Half an hour into the design session, one of the designers suggests an existing game that appeared to fit the features identified; a game called 'Contraptions'.

A debate followed between the student designers (observed on video, see Appendix 5.7) about whether this is an acceptable concept to use, since it is not truly 'original'. The debate continued through most of the design process while they worked on adapting the basic concept by refining its content to suit some of the suggestions made by the target user group. Their design concept is detailed in full in Appendix 5.5.2. It is a problem solving, level based, points for skill and speed game, based on moving an object from A to B using a set of tools. A game involving strategy and skill, designed to be presented in sophisticated black and metal materials, incorporating springs, pulleys, chains and other 'tools' to aid the movement of the objects. Points are allocated according to speed and skill (the fewer tools you use, the higher the score).

Group C received their briefing last, and were instructed to follow the proposed Play Concept Generation Technique. Due to the time limits, they were only supplied with the prepared questionnaire and the tool kit sheets relating to motivators, environment and character. Additionally, they were given a copy of the diagram illustrating the theoretical context of the methodology (see Appendix 5.3 and Chapter 1, Figure 3) and a brochure of current products to evaluate. The group was also given copies of the existing software game design processes given to Group B (see appendix 5.3 for brief and processes supplied to Group C).

Group C spent a lot of time discussing the whole concept of software games for this wide target group. Their notes (Appendix 5.6.1) reveal that they tried to penetrate the core elements of content for software games that would appeal to a much wider audience. They collected data from the library staff, using the questionnaire and tool kit sheets and used this information to find common preferences from the user group to direct their end concept ideas. The group also discussed at length (observed on the video) the importance of any game ideas being built around a principle that everyone could understand, for example gravity or tessellation. They also discussed and tackled the problems that inexperienced game players would have with understanding the 'rules' and

interactions of conventional computer games. Group C's final concept proposed 'games' that aimed to increase users' interactive competence when using technology.

The data collected from the user group prompted the designers to propose six ideas / principles that they felt should be adhered to when designing for this wide user group:

1. Non-character based games (the users themselves are the characters).
2. Games that run with the operating system and include quick-save options so users can dip in and out of the game.
3. Games that are built around universally understood principles.
4. Instill a sense of self-worth in the user.
5. Are screen-saver based and interactive.
6. Find a point at which those who don't normally play computer games begin to identify with the principles and actions of computer games.

Group C's conclusions (page vii of Appendix 5.6.1) reveal that they spent less time detailing a specific concept and more time working out the core principles around which a software game should be designed for this particular user group;

- Our idea questions what a game is and how people perceive the meaning of a game or play itself.
- Help to educate people – (the general population) on the language used in modern computer games – visual, interactive, sound etc.
- Only through education of these individuals will other console game markets arise.

The concept produced by Group C centres around a series of interactive screensavers. These can be viewed as a normal screensaver or can be interacted with. They suggest different examples falling into three categories;

music, education & knowledge and art & culture. One suggestion for instance, from the education & knowledge selection would contain images of landscapes or cultural scenes from around the world that could be interacted with to learn about elements within the image. Also, in the art & culture selection, perhaps a beach scene would contain mini games such as skimming stones, sandcastle building or kite flying. All of the suggestions put forward by the group are detailed in Appendix 5.6.2.

4.13.2 Designer Feedback

At the end of each group's design session, the students were asked to complete a *designer feedback sheet*. The student designer's responses to each question are presented in full in Appendix 5.8 as the following tables:

Designer Feedback :

- Table 1 - Participant background information.
- Table 2 – Experiment description & advice record.
- Table 3 – Design Activity and Process.
- Table 4 – Designers response to concept idea.

It should be noted that due to the groups' staggered timetable, Group C did not finish the experiment until 6pm and were in a hurry to leave, so perhaps did not give as much time to their feedback sheets as Group A or B. However, in addition to the feedback sheets, a discussion session was implemented on the next day that the students were all together. This feedback session was recorded on video. The responses of the student designers to the design experiment will be discussed later in this chapter, in section 4.13.4, Evaluation of the Design Experiment, after the presentation and analysis of the results of the target user group feedback.

4.13.3 Target User Group Feedback and Analysis

It is important to reiterate here that the purpose of the experiment was to establish whether the method used by the design teams to generate a software game concept for a specific user group, would affect the likelihood of that concept appealing to that same target group. To ascertain, therefore, whether the concepts generated by the design groups were appealing to members of the target audience (25-25 year olds), responses to the different concepts that had been generated were collected from the library staff, who had been identified as a potential target user group for the experiment.

Eight respondents participated in this feedback session. Each concept was presented to them individually, time was allowed to read the concept statements and view the visuals produced by each design group. Each respondent from the target user group was asked to rate the concepts according to the following scale:

- 0 – of no interest
- 1 – of little interest
- 2 – might try
- 3 – would try
- 4 – interesting
- 5 – would play regularly

Group A's concept was presented first, and then rated, after which Group B and C's concepts were presented and rated by each respondent.

Suggestions and discussion arose during the feedback rating session as the users determined how they related to each concept. Where notes or suggestions were made by the users, these were recorded alongside the relevant concept idea.

The ratings for each group's proposal are presented in table 4.13.3.1.

The user participants are identified by a number in the first column, which represents their age at the time of the experiment and a letter corresponding to whether they are male (M) or female (F).

User Age / sex	Rating for Group A concept	Notes on Group A concept	Rating for Group B concept	Notes on Group B concept	Rating for Group C concept	Notes on Group C concept
53 F	1		4	But cost dependant	4	A bit like <i>Corkboard</i> which I liked.
50 F	4		0	Not my thing, but husband would love.	3	Positive time factor.
47 F	2		2		4	
38 F	2	Time restriction though	3	Positive time factor	4	Positive time factor
36 F	3		4		4	
34 F	3 / 4		2	A bit like <i>Super Monkey Balls</i> which I play a lot.	3 / 4	
31 M	3		4		2	Might dip in to this but am already a gamer.
27 F	2	But would not buy before trying	4 / 5	More likely to buy	4 / 5	Would also like a music keyboard on screen to play.

Table 4.13.3.1 Target User Group Feedback to Concepts generated by Student Design Teams

Subsequently, the user group respondent's ratings were analysed. Firstly quantitative 'score' based results were obtained. Each groups' concept idea was given a score according to the user ratings (see table 4.13.3.2 below). This was calculated by multiplying the number of votes given for each rating, by the value for that rating (ranging from 0-5). The total for each concept could then be calculated by adding the columns for each group:

Rating / Score	Total User Ratings for Group A Concept	Total User Ratings for Group B Concept	Total User Ratings for Group C Concept
5	$0 \times 5 = 0$	$0.5 \times 5 = 2.5$	$0.5 \times 5 = 2.5$
4	$1.5 \times 4 = 6$	$3.5 \times 4 = 14$	$5 \times 4 = 20$
3	$2.5 \times 3 = 7.5$	$1 \times 3 = 3$	$1.5 \times 3 = 4.5$
2	$3 \times 2 = 6$	$2 \times 2 = 4$	$1 \times 2 = 2$
1	$1 \times 1 = 1$	$0 \times 1 = 0$	$0 \times 1 = 0$
0	$0 \times 0 = 0$	$1 \times 0 = 0$	$0 \times 0 = 0$
	20.5	23.5	29.0

Table 4.13.3.2 Total User Ratings for Concepts from Groups A, B & C.

This quantitative method suffices to identify which groups' concept received the highest total rating by the target user group. From these results it is clear that Group C received the highest score, 29 points. However this method does have disadvantages, since there is no evidence for the relative scale values. Further investigation would therefore be required in order to establish such a value scale and ascertain whether for example, 5 is five times the value of 1 in user

valuation. Additionally, this quantitative method of analysis does not illustrate how the ratings were distributed for each of the groups.

A visual method of analysis was therefore established that would illustrate the distribution of ratings quickly and effectively. The second analysis of the target user group ratings was achieved by visual means in the form of a cluster analysis diagram which illustrates where the user's preferences lie on a 'target' chart. The closer to the centre of the target the ratings are, the higher the appeal of that concept to the target user group, see figure 4.13.3.3.

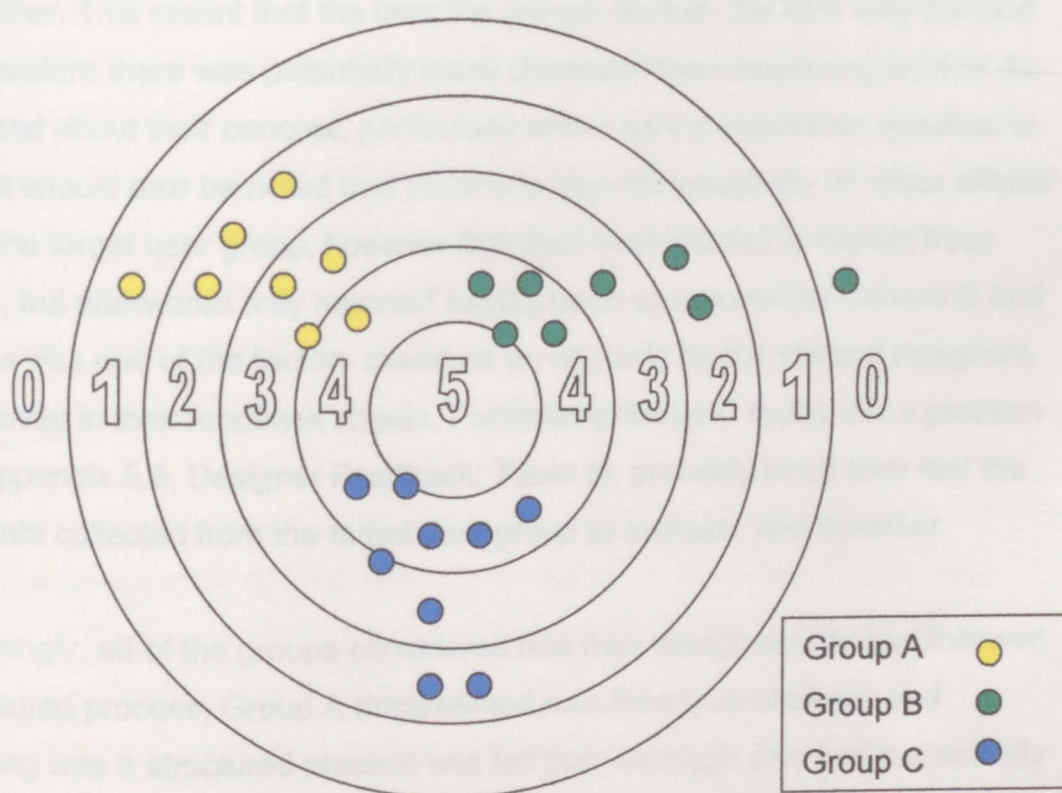


Figure 4.13.3.3 Cluster Analysis Diagram showing Target User Group Ratings for Concepts from Groups A, B & C

This analysis method allows a quick, visual identification of where the ratings are placed by the target user group. It can be seen that Group C's ratings are distributed closer to the centre of the target and therefore that their concept is the most popular and appealing to the target user groups' preferences. The other two groups ratings are more spread towards the outside of the target, illustrating lower scores and therefore less appeal to the user group.

4.13.4 Evaluation of the Design Experiment.

The design experiment was carried out under controlled conditions. The main obstacle was the time restriction. The experiment had to be carried out in one day in order to avoid the possibility of the student designers conferring about their ideas or methods. There was the added restriction that the three different groups could not access the target user group at the same time and therefore the experiment had to be staggered, with the groups running one hour behind each other. This meant that the later the groups started, the later they finished and therefore there was potentially more chance of them becoming tired or demotivated about their concept, particularly with a tight presentation deadline to meet. It should also be noted that there was also the possibility of 'order effects' within the target user group, however they had been briefed to expect three groups, but afterwards only reported having been questioned by Groups B and C. Time was one of the factors raised as an obstacle by the student designers themselves in their feedback sheets. Particularly Group C found this a problem (see Appendix 5.8, Designer Feedback: Table 3), probably since they had the most data collected from the target user group to evaluate and consider.

Interestingly, **all** of the groups considered that their design activity had followed a structured process, Group A documented how their brainstorming and sketching was a structured process and felt that, although they had not actually collected or spoken to any of the target demographic, that they had considered them in their process. Group A recorded that they had found documenting their process easy, by simply notating their thoughts as they went along. Group B students recorded that they found documenting the discussion side of their process more difficult than the brainstorming. They identified that the process they had followed, from Stoll (1999), had helped them quite a lot and that they had been surprised by some of the results obtained by questioning the target user group. They felt that the 'questionnaire' they developed had given them insight into what kind of game to design.

"..The questionnaire gave us a good idea about what people from this age group expect from a game, what kind of games they prefer and why they still choose card and board games over computer games." (Student Designer 3, Design Experiment, 2003)

Group C documented how they found that the time constraints and the fact that their discussions covered 'too many tangents' as reasons why they found documenting their design process as 'difficult' (student 5) and 'OK' (student 6). Student 6, from Group C, records that the process 'helped to manage tasks according to deadlines'. Student 5, however, was clearly commenting on the schedule for the day, rather than the actual design process followed, when stating that the process was a 'hinder' since they actually state that the group 'could have done with more time before going into the library'. Later discussion between the student designers after the experiment (during the designer feedback session, Appendix 5.9), recorded on video, revealed that the same student had found the whole process really useful for encouraging thinking outside of the normal parameters of the design problem.

Several student designers also raised concerns that the potential target user group (the library staff) did not adequately represent the whole target user audience of 25-50 year olds. It would however be impossible in any design activity to represent everyone from such a vast group. The purpose of the experiment was to establish whether the method used by the design teams to generate a software game concept for a specific user group, would affect the likelihood of that concept appealing to that same target group. It was therefore an ideal opportunity to generate ideas that would begin to appeal to such an audience, better than perhaps the current leisure software products did. In this context any information gathered or ideas generated could then be tested with a larger demographic for a wider user response and analysis at a later date.

The experiment results show that the target user group feedback indicates a preference for the concept generated by Group C, who had utilised the

proposed Play Concept Generation Technique. Group A and B's results were certainly not dismissed or disliked by the target user group, in fact one user preferred Group A's concept over the others, (although they also admitted that they wouldn't have time to play it much) and three users rated Group B's concept at the same level as Group C's. In general, however, comments from the target user group during the rating process, inferred that Group C's concept would be more likely to appeal to them and their peers. This was mainly due to the simplicity of the concept and it's 'escapist' appeal. They particularly liked the concept of some of the mini games within landscaped images and the cultural and educational value of some of the other suggestions for interactive screensavers and desktop icons. They were quick to identify the relevance of a 'positive time factor' in that these play concepts would be easy to 'dip in and out of'. This was felt to be particularly relevant since they all articulated that they did not have much time for playing computer games during their busy lives.

In conclusion, the experiment did illustrate that the proposed Play Concept Generation Technique assisted the student designers of Group C in collecting data and interpreting what would appeal to a specified target audience better than the processes followed by the other two groups.

On close examination of the video footage from the experiment (see Appendices 5.7 and 5.9), it can be seen that as much information was utilised from the questionnaire issued to Group C as from the Tool Kit. This stage of the technique should therefore not be undervalued in its ability to identify key elements and contexts that would affect a target audience's preferences for play. Much information was derived from the questionnaire relating to the kind of activities already followed by the target group in their spare time, in addition to the information collected about their existing interaction with technology and what attributes were preferred within an interactive digital play environment. For example Group C discussed (on video) how the users had revealed that they generally viewed the technology as a means to do their work, rather than as a forum for play. This led the group to aim to design something that bridged the

gap between elements of technology that the users already understood and making these elements fun to 'play' with; to encourage the user to increase their competence with technological interaction. It was at this point that the suggestion of 'interactive icons' arose and was documented.

Clearly the experiment revealed that the process should not be hurried. In fact the more time spent exploring the core attributes of play with a target user group, the better. Obviously, this would have to be kept within practical limits, as illustrated by the research with the teenage girls in a school environment. However, any contact is better than none. This was illustrated during the experiment by Group A, who did arrive at a game concept, within twenty-five minutes of beginning the exercise, that they considered would appeal to the target group (and possibly an even wider audience). However, this group's concept was based purely on the assumption that everyone is interested in popular culture and more specifically the concept of the 'celebrity' since they identified this as being of current cultural interest. They suggested that in the future everyone would want to develop an 'Online Persona' that could socially interact in a virtual environment. The feedback from the user group however, contradicts this. Only 1.5 respondents rated Group A's concept as 'interesting', in comparison with 3.5 respondents rating Group B's concept 'interesting' and 5 respondents rating Group C's concept as 'interesting' (see table 4.13.3.1).

Additionally it was observed that Group A arrived at a concept very quickly and spent all of the rest of the design time developing detail for this one concept and no other. This could prove very costly in a real design studio where designers are paid for their time and detailed design does not necessarily mean that the concept itself will appeal. In contrast, Groups B and C found it much harder to arrive at a particular detailed concept in the time given, since both groups spent much more time analysing and considering what would appeal to the audience. Both of these groups presented concepts that were more general and less detailed. They demonstrated that the data collected from potential users was

crucial to the process of *understanding what would appeal to the end user*. This had been indicated to them in the design processes issued with their briefs.

In addition, the video footage (Appendices 5.7 and 5.9) revealed that initially all of the student designers felt that they were designing for a group of people who had no interest in computer games at all. During the experiment, Group A continued with this assumption and played on the idea that people would be attracted to the concept of 'celebrity' and the development of an 'Online Persona'.

Group B attempted to create a concept that would appeal to the user groups' interests and current leisure activities; targeting puzzles and problem solving concepts and proposing a concept based on an existing game, which had previously been sold, but had now been reduced to 'abandonware'.

Group C collected data to identify the interests of the user group in addition to what factors affected their play behaviours. They identified factors such as time restriction (which was also identified by Group B), but more importantly, they identified the fact that this user audience did not have the experience of software games and the language and actions that are taken for granted by most of the current younger generations of software game players and designers. Group C realised that in order to 'convert' this generation to the potential of 'inclusive interactive play', they would have to design something that would begin to educate and introduce the target audience to the potential fun of the environment. They suggested that this could be achieved by designing concepts that were very easy to use and did not involve knowledge of complicated interfaces or specific lengthy role-play scenarios.

During user feedback, it was apparent that all of the user group did have an interest in interactive play and were keen to see these new ideas from the designers. Additional and continued feedback has also been received since the experiment took place verifying the conclusion that this really is a potential user

audience that simply desires interactive play that is more relevant to their interests, lifestyles and technical competences. Several expressed an interest in being part of further research in order to develop such products.

Group C came closest to discussing the real issues underlying the problems with the way that leisure software products are developed. Many assumptions are made by young designers about what a computer game is and what format interactive play should take. Group C tried to dispel these assumptions and tackle a wider perspective in relation to the design problem. To quote one of the students describing the experiment in their own words;

“It is a step through your own mind for the benefit of others.”

(Design Student 6, Design Experiment, 2003)

The designer feedback session (see video footage in Appendix 5.9) produced lengthy debate on exactly this issue. Group C's concept was criticised for not really being a 'software game' since it did not contain the expected attributes assumed 'normal' for software game play. Members of Group A felt that no matter how much you questioned people on their preferences, if they had no interest in computer games to start with, then you would not ascertain any useful information to convert them by questioning them. They defended their concept being based on popular culture, since they felt this was the strongest factor in what would appeal to the general public. However, this opinion was refuted by members of Group C, as they emphasised that it was necessary to question the whole concept of what a 'game' or 'play' should be, in order to design for a wider audience and for people who simply did not have the time to sit for 3-4 hours in immersive role-play environments. Their concept specified that the user should be the main character in any game, and that the main interaction should be between user and computer rather than via virtual characters. They felt that an education of gaming language needed to be developed in order to enable new users to relate more closely to the interactive experience and feel they were retaining control over their actions and increasing

their competence and familiarity within a virtual play environment. This in turn, Group C felt, would make them more likely to return to interactive play again, rather than being 'turned off' by characters they couldn't relate to or complicated and lengthy procedures and actions that would inhibit their enjoyment and fun.

Group C also concluded that any concept aimed at a wide audience should focus around universally understood principles that would be simple to interact with, for example *Tetris*³³, which they identified correctly as one of the most popular and widely appealing software games ever developed. They discussed how *Tetris* was a game based around a simple universally understood principle that regardless of culture, religion or age, would appeal to a very wide-ranging audience. They also noted that *Tetris* was characterless and therefore would not exclude anyone from playing it. The group agreed that as soon as characters are introduced to games, people have to draw even more relationships with them, where as a shape, rather than a detailed character, would stand more chance of appealing to a wider user group.

During the designer feedback discussion session all of the students agreed that there was huge untapped scope for new interactive digital play media and that future development needed to focus on how people perceive play, to establish what they consider would give them 'time out' from mundane tasks. The experiment was therefore viewed as an opportunity to collect information and ideas on how to begin to reach wider audiences who have very different perceptions of what 'play' is and find it difficult to relate to the current range of leisure software products available.

It was felt that by opening up their minds the students had begun to identify potential activities 'on-screen' that would appeal to this wider audience. It was agreed that these activities could begin to draw more and more people into the idea of interactive play with the consequence of reducing the exclusivity of 'video-gaming' in particular and increasing competence with, and access to, technology in general.

The conclusion from the students as to why designers should even attempt to design for people who are not interested in software games was that this wider demographic should be enabled to have the same access to technology that is afforded to the narrow demographic of current 'gamers'.

The students also agreed that the experiment had been a useful experience and one that they would like to repeat. To quote one student (from Group A):

"Yes, I'd do it again... it's good experience... and now that we have all spoken, I'm thinking outside of the box. Yes we should do it again."

(Design Student 2, Design Experiment, 2003)

The experiment was therefore deemed to be successful, since in itself it had opened up the minds of several young designers who had an interest in designing for technological environments. In relation to the specific processes followed by each group, it would appear that Groups A and B followed typical software game studio processes, in that one arrived at an instantaneous idea, that ran the risk of being either a 'hit' or a 'miss' product, while the other opted for a solution already in existence, that 'fitted the bill'; the typical, safe, 'franchise' route of a lot of current software game development. Group B, did however indicate how they could update or revise the basic concept to increase the appeal to a wider audience; commonly known as 'versioning'. Neither of these approaches are incorrect, since they could very well produce products that are both marketable and suitable for a wide audience.

Group C, however, managed to come up with concepts that were definitely more appealing to the target group than the other two groups (see User Ratings, Table 4.13.3.1, 4.13.3.2 & Figure 4.13.3.3). It is logical to deduce that this was because they gained a better understanding of the audience and managed to 'tap' into their interests and behaviours. The proposed Play Concept Generation Technique issued to Group C to utilise, only contained the initial two stages of the process, due to the lack of time for the design experiment, but Group C certainly

collected the most data from the user group. It was observed that the data collected from the questionnaire and Tool Kit, and the theory behind the process that was issued to them in diagrammatic form, were central to the content of their lengthy discussions about how to tackle the design problem. It is therefore concluded that the process they followed, assisted them in arriving at concepts that were more appealing to the target user group and therefore to a wider audience than the other two group's concepts.

4.14 Evaluation of Play Concept Generation Technique

The *Play Concept Generation Technique*, interestingly, did generate concept ideas in both scenarios where it was executed, both with the teenage female user group and with the 25-50 user group. The design experiment particularly demonstrated how the technique compared with other recognised design processes, the results illustrating that the user group preferred the concepts it generated.

The technique itself should not be viewed as exclusive or fixed, but rather as a method that enables discussion around the topics relevant to the particular user group under observation. The questionnaire, although initially designed to collect generic leisure interest data from respondents, proved to be the most essential part of the process. It was this that determined the content of the rest of the process. For example, with the teenage girls, the questionnaire identified that they were already playing software games, so that further development could be concentrated on the content of potential games in more detail. With the 25-50 user group, it was identified early on from the questionnaire, that their 'play' interests lay predominantly in areas other than software, so elements of their attitudes and behaviour towards technology needed to be considered first, but in addition to any detailed content development of proposed concepts.

The questionnaire also provided valuable marketing information relating to each user group that would be essential in making any developed products accessible to the target group. Additional marketing information could also be collected from the *Tool Kit* components of the technique, at both preliminary (i.e. motivators / environment / character) and advanced level (e.g. colour and visual imagery with the teenage girls). This data would allow more informed choices to be made by a development team about the direction of their product and its place in a potentially expanding market.

The design experiment illustrated the importance of the process being given sufficient time to produce results. The group using the Play Concept Generation Technique clearly struggled to reach conclusions about their user group within the time frame of the experiment. However, they did manage to do so, and produced a result with which the user group was clearly happy. Given more time and the opportunity to explore the later stages of the technique further (an Advanced Tool Kit and / or a User Stakeholder Concept Generation Session), may have enable them to produce even more successful concepts for wider consideration.

To evaluate any method, it is necessary to test it sufficiently to establish its usefulness and efficiency. Further testing is beyond the scope of this study, however, the tests carried out so far have clearly illustrated that the proposed methodology assisted designers in the process of concept generation for two potential user groups that were previously ignored by most software development studios. Insights from the research enabled discussion to progress amongst designers and users about how to achieve wider audience participation for leisure software products. This study proposes that the role of *play* as a vehicle allowing access to technology should be developed to include all members of society who wish to participate. The challenge lies in convincing publishers and development studios to invest in these audiences, who have different requirements and desires to the established demographic of 'gamers'. Given the current cost of software game development³⁴, it is understandable that

companies are reluctant to invest the time and money in these sorts of ventures. However, the question still remains; *can they afford not to invest?*

Clearly, assumptions that these wider user groups have no interest in interactive digital play media have been refuted by this research project. Both user groups consulted had a keen interest and were very enthusiastic about being involved in research to develop products in this area. Most enquired about when they would be able to obtain these new products, and had to be informed that all of the concepts were just that, only concepts. Without further development, those concepts will be resigned to a fate worse than that of the 'abandonware' noted by one of the design students, since they will never even be developed. However, future interest from software publishing companies and studios could prevent this. Developing the research further, in conjunction with a professional studio, would allow for further evaluation and development of the process, in addition to potentially providing new insights and resources for designers working in the interactive digital media industry.

¹ Electronic Arts Inc.

² A market segmentation analysis carried out by Continental Research in March 1999.

³ Electronic Arts, Chertsey, Surrey, UK.

⁴ Argonaut Games plc, Edgeware, Middlesex, UK

⁵ Published by Infogrames, 1999.

⁶ Developed by Mattel, 1997. Published by Infogrames, 1999.

⁷ Developed by Hasbro Interactive Inc, 1999. Published by Infogrames, 1999.

⁸ Developed by Guidhall Leisure Services Ltd / Manacom, 1999. Published by Infogrames, 1999.

⁹ Developed and Published by Infogrames, 1999.

¹⁰ 1999. Squaresoft / SCEE

¹¹ 1997. Argonaut Games / Fox Interactive

¹² 1999. Insomnia Games / Universal Interactive Studio

¹³ 1997. Bullfrog Productions Ltd / Electronic Arts.

¹⁴ 1999. Bullfrog Productions Ltd / Electronic Arts.

¹⁵ 1997. Bullfrog Productions Ltd / Electronic Arts.

¹⁶ 1998. Bullfrog / Bullfrog Productions Ltd (a subsidiary company of Electronic Arts).

¹⁷ 1989. Maxis / Electronic Arts.

- ¹⁸ MCV. The Market for Home Computing & Video Games. 1999-2000. A weekly dedicated trade publication for the UK & International interactive entertainment business and games industry.
- ¹⁹ A market segmentation analysis carried out by Continental Research in March 1999.
- ²⁰ Electronic Arts Inc.
- ²¹ Clive Arundell; Digital 3D Design Course Leader with substantial knowledge of the digital design field and familiarity with the content and production of computer games.
- ²² De Montfort University.
- ²³ Derived from a combination of the psychological literature, existing software game objectives and the responses given as motivators in the questionnaire.
- ²⁴ Image source: Faber, L. & State Design (1998) *Re:play. Ultimate Games Graphics*. London. Laurence King Publishing, p111.
- ²⁵ 2000. Maxis / Electronic Arts.
- ²⁶ Figures from two studios based at Electronic Arts, UK headquarters, Chertsey revealed that in February 2002, one of these studios had a staff split of 182 male and 19 female employees, but on the Publishing side had staff made up of 137 male and 101 employees. The second studio revealed a split of 148 male and 16 females working in the studio. However, further breakdown of this team revealed that those 16 females worked as follows: 2 in Finance, 4 in Human Resources, 3 in Audio, 4 in Admin support, 2 working as Artists and 1 as an Art Production Manager.
- ²⁷ *Sugar* magazine (Hachette Filipacchi UK Ltd).
- ²⁸ *Bliss* magazine (Emap plc)
- ²⁹ *Tomb Raider*. Core / Eidos (1996/97) PC & Playstation. Created by Toby Gard in 1994.
- ³⁰ *Sugar* & *Bliss* magazines.
- ³¹ The Sims Expansion Packs (Maxis / EA Games):
The Sims Vacation (March 2001) North America
The Sims House Party (April 2001) US & Europe
The Sims Livin' Large (Sept 2001) US & Worldwide
The Sims Unleashed (Late Sept 2001) US & Europe
The Sims Superstar (May 2001) US & Europe
The Sims Hot Date (Nov 2001) US & Europe
The Sims Makin' Magic (Late Oct 2003) US & Europe
- ³² Processes identified in a presentation by Dene and Simon Carter of Big Blue Box Studios Ltd.
- ³³ *Tetris*. Released 1989 on Nintendo's Game Boy, but originally programmed on an IBM-PC. Designed by Alexi Pajitnov, a Russian math researcher and programmed by a student of computer informatics at the University of Moscow. *Tetris* was soon available on all formats, including arcade, PC, most home consoles and Game Boy. Reputed to be the most popular and addictive video game ever. (Herz, 1997)
- ³⁴ In the region of £3-5 million (including marketing) over 2-3 years of development. Source: European Leisure Software Publishers Association (ELSPA) at *Exploring the Potential of Computer Games*, Conference, Excel, London, 20th March 2002.

5 Designing for the Future:

Inclusive Social and Technological Development

5.1 The research journey

This section reflects on the journey that this research project has taken and documents the changes in thinking that occurred as the work progressed.

The key factors drawn from the reviewed literature and fieldwork are highlighted and discussed in relation to their contribution to the research or design methodology proposed.

The main focus of research and development in this dissertation, the proposed Leisure Software: Play Concept Generation Technique, emerged after undertaking a study for a software game publisher¹ to establish whether teenage female users had any interest in interactive software games. A market research report² of PC users had illustrated that there were fewer sales of leisure software games to teenage girls when compared with boys of a similar age and with girls in the 5-12 age bracket.

The initial year, relevant to the study, therefore investigated, through primary fieldwork, a representative section of the UK female market, aged between 13-19 years old, during the period November 1999 to September 2000. The aim was to answer the publisher's research question, of whether teenage girls were, or were not interested in software games, and also to provide a study of this user group's attitudes to software games, in addition to proposing product concept designs and solutions that would begin to address wider user participation in interactive play. The following aims and objectives of the initial year of the study were therefore agreed as being:

To begin the Market Research Study, a questionnaire (see Appendix 1.1) was

1. A Market Research Study

To identify the consumer attitudes and behaviour of the female market segment aged 13-19 towards leisure software.

2. A User Behaviour Study

To study the key interests and features of potential products which would affect purchasing decisions of this user group.

3. Product Development Proposals

To design and specify a range of concept products which would meet the expectancy and interests of the specified group.

From the beginning of the study, it was clear that the literature review had to be ongoing in order to reflect the constant growth of literature on the subject under scrutiny. This approach also allowed the analysis and inclusion of any relevant emergent research that needed to be considered.

The initial review of literature relating to play, revealed a large volume of work on the psychology of play, and discussed motivation as being a key factor in the drive to play (Freud, 1955; White, 1959; Maslow, 1954, 1970). Play was also regarded by many of the psychologists and philosophers reviewed, to be a source of learning and social development (Huizinga, 1944, 1955; Piaget, 1951; Erikson, 1950, 1963; Tudor Hart, 1955 and Ackerman, 1999). At this point in the study there was a lot of ground to cover, and a decision was taken to continue with the literature review throughout the progress of the study, since the fieldwork had to begin almost immediately, in order to meet the expected deadline of reporting back to the publisher within one year. The review of psychological literature that appears in chapter 2, therefore provided a continually evolving reference background for the study and later became influential in confirming particular motivational factors as key to the concept design development process.

To begin the Market Research Study, a questionnaire (see Appendix 1.1) was developed (detailed in Chapter 4, section 4.4.1) that aimed to identify the general leisure interests of the specified user group before any detailed research was undertaken into their leisure software interests. It was considered important to keep the questions general at this stage in order that the whole range of interests pertaining to this user group, could be established. Certain factors were considered to be important; what they chose to do with their spare time or money and what their interpretation of 'a game' might be. Initially it was necessary to see if they played any games at all rather than specifically software games. The psychological literature review indicated that it was also important to find out what would motivate play. The study required an understanding of what it was like to be a teenage girl at that time in cultural history. This allowed an observation of the extent and variety of their interests while still recording any patterns that would emerge. In addition, it was important to find out exactly what access the girls surveyed had to any interactive play equipment and whether they were using this for interactive play.

The results of the questionnaire studying the user interests, user behaviour and interactive psychology of teenage girls, established that teenage girls did, in fact, have a substantial interest in interactive play, but simply did not buy the existing games, since they preferred to spend their money mainly on clothes and music. The results also confirmed that they did have considerable access to interactive play equipment, with later studies at focus group level revealing that playing borrowed or pre-loaded software games was common. It appeared that, in general, teenage girls did not consider software games appealing enough to warrant the cost of purchase.

The direction of the project altered at this stage to focus on finding out what features of potential products would be appealing to this user group and to establish what kind (if any) of interactive software games they would be interested in buying. This was the beginning of the second stage of the initial fieldwork; that is, the User Behaviour Study.

In order to identify the key interests and features of potential products and

In order to study the key interests and features of potential interactive play products, which would affect purchasing decisions of this user group, guidelines and methods for such a design process, were sought. However, a review of design process literature at this stage of the study, late in 1999, revealed no published design methods specifically for interactive software games. Methods had developed within Systems and Technology Design, but none of these were considered to be specifically useful tools for deriving or establishing information within a play context, particularly in relation to concept generation. A large number of existing design methods were therefore researched, reviewed, analysed and evaluated in order to establish whether any of them could be used to aid the design of concepts for interactive play. This review also had to be continually carried out during the time of the study (detailed in *Chapter 3: The Design Process*). Primary research with the publishing company and several development studios was also undertaken at this stage of the study, to establish studio structures and to identify any design processes being used in development. From the discussions with these professionals, at that time, it was established that no consensus on methodologies for the research or design process under investigation could be identified. A review of the leisure software games available at that time also clearly illustrated that there was a definite lack of variety of content in software games to appeal to new, or even mainstream users, and that most publishers were opting for safe options for leisure software development either by regenerating old concepts that had already sold well, or by acquiring franchise rights to existing well established fictional concepts.

Control, Learn, Nurture, Participate, Explore, Create and Connect. Further

Several design methods emerged for concept generation from the general design process literature review. Jones' (1970), three stage process of *Analysis, Synthesis and Evaluation* or *Divergence, Transformation and Convergence*, was considered to be the most useful, albeit as a wide reference framework. This process was considered to be similar in approach to Stoll's (1999) method for *Customer Focused Concept Design*, which also proposed a three stage methodology comprising; *Understand, Create and Refine* phases.

In order to identify the key interests and features of potential products and generate new concepts for the specific context of interactive play, it became clear that, given the lack of existing specific design guidelines, a design process would have to be developed in order to establish how to attract potential users that did not currently have an interest in existing software game products.

The ongoing literature review revealed the emergence of the importance of mental models or cognitive maps in the technology design process review (Preece, 1994; Sasse, 1997 & Passini, 1999) and in the psychological review (Tolman, 1948). This suggested a potential route for the development of visual tools to aid the design process at a more detailed level.

A comparative analysis of the components considered relevant to software games at this point (see Chapter 4, section 4.5) revealed three main areas that appeared essential in constructing interactive digital concepts and content. These were; *objective or play motivator, environment and character(s)*. It was therefore decided that these three areas required further investigation in order to guide the design of concept and content generation and appeal to the user group under study.

After further comparative analysis of the *objectives or play motivators*, using qualitative and quantitative data derived from the initial questionnaire results along with the existing game genres and product concepts, the range of play motivators was established to describe eight different play objectives; *Win, Control, Learn, Nurture, Participate, Explore, Create and Survive*. Further comparison with the psychological literature revealed strong theoretical support for all eight of these as motivators of play. (see Chapter 4, figure 4.5c, Taxonomy of Play Motivators)

The 'objective or motivator sheet' therefore became the first tool in the Tool Kit that was developed to identify the key interests and features of potential products that would appeal to the female teenage user group. Other tools were

developed to study the features and attributes relating to the other two main factors identified as crucial to the design of interactive digital content; the environment attributes and character attributes. A game play observation session and feedback form were also prepared, offering a range of 30 existing software games.

This Tool Kit was utilised at focus group sessions comprising of 19 users within the 13-19 female group specified and the results were collected and analysed. The results generated patterns of preference that were considered useful for identifying the key interests and features of potential interactive play products. Results at this stage of the User Behaviour Study, also identified other factors that would require further investigation if detailed design of concept ideas were to be undertaken for this user group. An example of this was the idea of 'colour' that emerged as being an influential attribute of environment. This factor was therefore taken forward to an Advanced Tool Kit stage, which involved further focus group studies (detailed in Chapter 4, section 4.7 & 4.8). Additional game play observation sessions were also carried out at this stage and the games offered were mapped onto a colour quadrant chart (Kobayashi, 1998) to establish whether they fitted the colour preferences of the user group under investigation (see Chapter 4, figure 4.9.1).

The literature review by this time had uncovered the idea of 'generative tools' proposed by Sanders (1999). Sanders' vision of 'collective generativity', involving stakeholders in the design process using 'participatory make tools', was an interesting suggestion to consider in the design of new concepts for an emerging cultural environment. These *Generative Tools* were very recent proposals at the time that this study began. Being primarily visual and built upon the *aesthetics of experience* rather than the *aesthetics of form*, 'generative research' was considered relevant to this study since its aim is to discover unknown, undefined or unanticipated user or consumer needs.

Sanders claims that since the ideas produced by this method are more relevant to the users, because they have been generated by them, the end products and systems developed are more useful, usable and desirable. Sanders' argument that designers and social scientists need to work together more in the future to develop frameworks for the understanding of user experience and to synthesize and integrate ideas and opportunities, provided encouragement to involve users as stakeholders in the design process to generate new concepts for this study.

The Advanced Tool Kit stage of the initial fieldwork study therefore also included a 'Create and Explore' session (see Chapter 4, section 4.10). This session allowed participants from the user group under study to make their own suggestions for the creation of content within an interactive play environment. Several proposals for leisure software concepts were also developed further with a small selection of the user group under study, resulting in the production of the Leisure Software Product concept diagrams illustrated in Chapter 4 (figure 4.12.3.1, *The Sims Add Ons*, figure 4.12.4.1 the *Portable / PC Original* concept and figure 4.12.5.1, *Original Game Concept: GAIA / Virtual Contax*).

Independent of the focus group stakeholders, (although not of the data collected from them), the *Play Chooser & Classification Model* was also developed. This design involved the refinement of the taxonomy of play motivators that had been established at the Tool Kit stage, into the design of an interface that was considered to access technology through psychological play motivator, in four possible objective modes; *Survive, Create, Explore* and *Challenge* (see Chapter 4, section 4.12.2). This design proposal was considered to have a dual purpose, since in addition to providing an interface or 'Access Portal' to interactive play, it was also considered to be a potential design for a three-dimensional classification model that could map the interactive choices of users. It was considered this would allow the development of a valuable data resource relevant to the dynamic nature of user behaviour or preference in the interactive

digital media industry. This proposal also offered a potential way therefore, of identifying areas of such a model that are saturated with products and of highlighting areas in need of substantial concept and content development.

The presentation to the publisher at the end of the first year of fieldwork, answered their original question and identified the key factors and interests relevant to the teenage female user group. The results were presented using traditional quantitative analytical methods to compare figures and illustrate key findings. Ideas for future marketing strategies, along with the concept proposals relevant to the user group specified, were also presented, as was the potential of utilising the Tool Kit in future design processes. The publisher was satisfied with the data and research produced during this year, and subsequently was observed to implement more informed marketing and development strategies relating to several products and particularly to their already established *Sims* software game. However, none of the original concept proposals were taken forward for further development.

It was at this point that much reflection on the work already completed took place, and the focus of this PhD thesis became apparent. The initial fieldwork for the publisher had revealed a lack of concept generation techniques for Interactive Digital Media. However, a design methodology for concept generation had emerged through the development of the Tool Kit, and other generative tools collectively utilised to investigate the female teenage user group. This emergence of a proposed design methodology was therefore clarified and documented as the original contribution of this thesis.

(Detailed in Chapter 4, figure 4.12.1, the *Leisure Software: Play Concept Generation Technique*)

The overall context of the study was also analysed at this stage, and emerged clearly as that of *humans accessing computers* and thereby technology in general. The particular focus for this study was the potential of this access being achieved through more inclusive design of interactive digital play media.

An initial review of research disciplines revealed that the most relevant subject under which this study would 'make sense' was the discipline of Human Computer Interaction (HCI). Since this arena of research was still emerging, Sasse's (1997) review of the history and nature of the Human Computer Interaction discipline (HCI), helped to inform and guide the study at this time. Sasse's recommendation for Grounded Theory (Glaser & Strauss, 1967) as a suitable research approach for HCI studies, seemed the most logical route to take, particularly as data had already been collected, and patterns, methods and theories already emergent. According to Strauss and Corbin (1990) grounded theory is designed not only to test theory, but also to build it, and offers the route of 'data-analysis-theory' instead of the 'theory-hypothesis-test' route offered by a traditional scientific approach. Sasse (1997) also stressed the importance that the required knowledge is generated to design more usable systems within a social and organisational context, arguing that integrating applicable knowledge from the science, design and engineering disciplines, is essential to establish theories relevant to HCI that are inclusive of all contributions and that advance the discipline.

The research methods that had already been used in the initial fieldwork were considered and identified as being; stakeholder participation, questionnaires, constant comparison, inductive and deductive analysis, focus groups, conjoint analysis, bivariate & multivariate analysis and generative research and tools. These were all methods that were relevant to Grounded Theory, which attempts to explain observations, in addition to providing a framework for identifying subsequent action. Also, a further literature review concentrating on grounded theory and ethnographic research methods revealed that further use of analytical methods, particularly multi-dimensional scaling and cluster analysis, could provide a particularly good method for visually presenting both quantitative and qualitative data for easy access by design and development teams. This offered a potential solution to the communication problems identified by Sasse (1997) as obstructing communication and therefore knowledge transfer between the disciplines of design, engineering and science.

Although the study began with a focus on software games, and therefore studied the psychological literature on play and motivation, this focus soon widened as the literature continually revealed links through motivated play to learning and social development. (Huizinga, 1944,1955; Piaget,1951; Erikson,1950,1963: Tudor Hart, 1955 and Ackerman,1999) As the study progressed further, it became clear that the influence and appeal of interactive play offered great potential as a tacit learning activity (Howe,1980; Oblinger,2002; Reviews of social and philosophical literature enabled a broader understanding of the context of interactive play and helped to clarify its potential to influence the domain of cultural and social learning and development. (Hendry,1983; Argyle,1996; Musick, 2000; Oblinger, 2002 & Sylwester, 2003) The importance of competence or self-esteem, stressed by Adler (1923), Maslow (1954) and White (1959), as a basic need in human development and survival, along with Freud (1906-08,1955 & 1959) and Erikson's (1950,1963) theories of 'playing things out', reiterated the importance of Piaget's (1970) proposal of *interaction* as the process by which knowledge is actively transferred and we make sense of the world.

The process and Tool Kit utilised in the initial fieldwork had been shown to produce results that were useful to concept generation for interactive play relating to teenage girls, however it was considered essential at this stage, to test the technique further. It was decided that an experiment with three teams of student designers, would be carried out, to establish whether the proposed design methodology could also assist designers in the generation of concept ideas relating to a wider audience of 25-50 year old users. This part of the study, the 'Design Experiment', is detailed in chapter 4, section 4.13. The experiment, in conclusion clearly illustrated that the proposed Play Concept Generation Technique did assist the design team using it to collect data and interpret what would appeal to a specified target audience, more effectively than the design processes or techniques followed by the other two groups participating. Subsequently, further tests of the design methodology were also undertaken with mixed sex teenage 'user groups', at a design workshop³, producing various interesting collaborative interactive play concepts.

The final stages of this research undertaking involved further reflection on the work and additional reviews of psychological literature. At this stage the importance of the psychological literature became apparent. The eight *play motivators* were found to be grounded in established theoretical work by respected psychologists (see Chapter 4, figure 4.5c Taxonomy of Play Motivators). A further later discovery was that the *Play Chooser* or *Play Nexus* interface motivator options (see Chapter 4, figure 4.12.2.2) were considered to be closely linked to the 'psychological factors determining human behaviour' identified by Jung in 1936 as; *hunger* (survive), *sexuality* (create), *drive to activity* (explore) and the *reflective instinct* (challenge). (Jung, 1960:116-117)

Reflection on the utility value and applicability of the approach and results of this study, along with the wider context of how interactive play could enhance learning, participation and quality of life, were undertaken during the final year. In conclusion this thesis informs inclusion and cross-cultural design, since *play motivators* are central to all people, not just young 'gamers'. It also informs the developmental design and practice of interactive digital play media in general, and specifically in relation to interactive play concept and content generation.

5.2 Conclusions

5.2.1 Interactive Digital Media Development

Literature reviewed in chapter 3 revealed that the established development cycles for Interactive Digital Media content or concepts usually begin with a 'requirements gathering' phase. However, no published guidelines could be found that suggested how to undertake requirements gathering specifically for the context of interactive play. This gap in published literature clarified the need for further design processes to be developed that could assist and guide designers both in the software games industry and in the wider context of

Human Computer Interaction. The software game design processes that were reviewed (Malone, 1980; Carter, 2001 and Cerny, 2002) all made reference to the importance of a concept idea, but provided no detailed methods (other than the options of franchise or insight) for how these concepts could be generated by designers. Malone's (1980) proposal did however suggest a possible classification of play in terms of challenge, fantasy and curiosity, which offers an alternative or complementary approach to content or play objective creation. In all of the technology processes reviewed, concept generation was recognised as an important starting factor, yet again none of the methods detailed how to arrive at a concept idea or how to direct content development specific to interactive digital play media.

This research undertaking informs developmental design and practice in this field, by introducing the *Play Concept Generation Technique*. The approach and methodology proposed, illustrate how interactive play concepts, interfaces and content can be created, that are based on the *psychological play motivator preferences* of users. Concepts and content produced by this process have, in the course of this study, proved to be more appealing to users from a broader demographic than those currently considered 'gamers'. The multidisciplinary approach therefore also introduces the potential of encouraging a wider user population to participate in interactive play environments that promote psychological, technological and social development and competence.

It is interesting, on reflection that there has been little previous focus on the motivators to play and more concentration on the character or environmental attributes of interactive digital media content development. It was established early on in this thesis that the direction of this development to date has been technological and focused on what we can make the technology do (Marcuse, 1964, 1991; Mantovani, 1996), rather than considering psychological content or social development as a potential starting point for design development.

Marcuse's proposal that in advanced industrialised civilisations; 'play of the imagination' has become about playing with technical possibilities to test for

realisation, still seems an accurate account of where we are in 2005, despite Marcuse making this observation over forty years ago.

This is not to say that developers do not consider content, since they clearly do, but the focus has tended to favour aesthetic appeal rather than content value. Murray's (2000) criticism of the leisure software industry as being too slow in understanding what people want or need from a digital environment, is perhaps a strong and bold criticism to make, particularly since financially the industry is doing very well; but if we are to make the most of interactive play as a social learning tool, concept and content *should* be considered of primary importance.

It is also interesting that much software game development to date has been focused within what would be termed the 'survive' motive. Ironically, perhaps this illustrates the current state of interactive digital media development itself, in that it appears to be unable to think outside of 'basic survival mode', making plenty of money to carry on doing what it already enjoys. However, current reliance on technology now requires future generations to adapt to the consequences of its immense impact on society. This thesis recommends exploring more creative ways to survive the challenge of innovating socially beneficial uses of that technology. An inclusive approach to interactive digital play media concept and content creation has the potential to substantially alter the evolution of human development within both an individual and a social context.

5.2.2 Designing for Inclusivity

The importance of *Designing for Inclusivity* is paramount in this study since this design approach intentionally aims to enable wider access to the arena of interactive play media where familiarity, learning and competence with technology and socially interactive systems are undoubtedly acquired.

The inclusive design approach taken to concept and content creation in this study, aimed to provide the 'liberatory space' identified by Marcuse (1964), Harraway (1991) and Murray (2000) as an important factor in individual identity and social development. Encouraging wider access to and familiarity with technology through play, reduces the risk of certain groups being at a disadvantage in technological awareness and competence. Long term, addressing this issue, raised by Subrahmanyam and Greenfield in 1998, could arguably produce greater social and technological advantage and inform inclusion and cross-cultural design. Mantovani's (1996) claim that technology has the power to undertake functions of social control, and Murray's (2000) proposal that new technology has the ability to capture experience as a process of interrelated actions, also influenced and encouraged the multidisciplinary research approach and the inclusive design approach. The *Play Chooser* concept proposed (Chapter 4, figure 4.12.2.2) articulates how this approach could be achieved in developmental design and practice. Later reflection on the name of this concept produced the suggestion of it being called the *Play Nexus*, since the word 'nexus' is defined as a 'bond, link or connection', which encompasses the design intention of wider user access in addition to that of user play motivator preference.

The fieldwork, detailed in Chapter 4 demonstrated that basing research and design for new developments in the leisure software industry on previous sales figures alone, would not widen the potential user demographic, which does include female participants. Importantly though, it also revealed that the development and commissioning of computer games is currently dominated by a cycle of versioning⁴ and licences. The gender issues with which this study began, therefore, merely helped to identify a wider, more urgent need to address the issues of all potential users in society and their right to have equal access to technology, bearing in mind that the skills that serve many highly technical jobs in today's society were acquired in video arcades in the 1980s (Herz, 1997). Also, Mulgan's (1997) argument that people often feel inadequate to their social tasks, mainly due to being unprepared for an environment in

which there are fewer fixed rules and certainties, and that the current education system treats children as passive recipients of received knowledge, leads to his recommendation that the curriculum of the future needs to provide interaction with technologies in addition to involving schools in the life of the community, so that they can make real decisions and experience real world knowledge. The argument that people should be allowed to fail, risk and take responsibility, in order to gain an understanding of the world and develop a mentality which is more suited to the cultivation of stronger more adaptable people, is a prospect that could only be beneficial to both state and society in general. Bucciarelli's (1994) argument that design as a social process, needs to reverse the trend of fixation on the physics of a device that has dominated much technological development to date, was therefore considered a serious factor in the research and design approach, along with Hendry's (1983) theory stating that feedback can lead to learning and result in changed behavioural patterns, altered attitudes and beliefs and to the development of a more stable self-concept.

By introducing motivational factors, identified in psychological theories, as the Interface or 'Access Portal' to interactive play, the approach taken in this study attempted to provide access to fun tacit learning environments which could promote the development of technical and socially beneficial interaction, via a different access route from that normally experienced by software game players, who currently rely on prior knowledge or 'in your face' marketing campaigns to provide product content knowledge. Interacting with the Play Chooser software (Chapter 4, figure 4.12.2.2), offers a user the alternative of accessing interactive play products by selection of psychological motivator rather than by prior knowledge of the product or by marketing exposure.

The inclusive approach to digital content creation pursued in this study, has the potential to enhance learning, participation and competence within the context of technological and social interaction since it provides play environments which are psychologically reflexive (Mead, 1934), allowing users to experiment and observe themselves from different perspectives ('the liberatory space'),

Acquiring a range of social perspectives can then be used to evaluate and potentially alter future behaviour. Mead's distinction of the difference between *play* and *games* is interesting, since he clarifies that games involve *rules*, and proposes that through *play* (which may involve the games of each character involved), a person develops their socialised part of the self. Observation of current interactive play products revealed that most adhere quite strictly to 'rules', and that few offer more liberatory play that is directed by the user, rather than by a rigid 'story' or so called 'game plan'. The proposals and opinions of Sylwester (2003), in addition to those of Von Krogh, Ichijo and Nonaka (2000) provide potential guidelines on how to enable knowledge and innovation to deal with the serious moral, political, economic, and cultural issues that are confronting our society. Innovators are exactly what are needed to tackle the issues of inclusive access that currently confront future social and technological development.

The original contribution of this thesis, a concept generation technique, designed to promote inclusive access to technology, individual learning and social development through play, helped to generate concept designs for various interactive play environments that would answer Sylwester's (2003) call for learning in the environment of an 'extended laboratory', and could easily be designed at detailed developmental stages to provide learning in social decision making. *Leisure Software Concept 4: GAIA / Virtual Contax*, proposed in Chapter 4, section 4.12.5, which was created with a focus group participating in this study, is a particularly good example of how this idea might work.

Sylwester's argument that today's youngsters (who have to master cyber space and time in addition to natural space and time), should be essential participants in developing a future culture of '*collaboration for innovation*', in which decision-making and exploration are encouraged, has been reinforced by the fieldwork covered in this thesis. However, if we truly want to foster an environment that is most likely to be innovative, then we need to usefully and genuinely involve all ages, so that consideration can be given to all knowledge rather than just

established paradigms. Only a reciprocal process involving users, designers and technicians will lead us toward greater success in using technology to enhance the learning experience (Marcinkiewicz & Sylwester, 2003). This approach makes a lot of sense in the context of future social and technological development. Designers need to draw on many other areas of knowledge (in addition to established or previous designs or methods) in order to make informed choices about ways of improving the environment and society that they seek to serve.

The design of a methodology that could ascertain the motivators for play, with a specific potential user group (teenage girls), allowed consideration of a wider range of users and highlighted the observation that current design practice within the leisure software industry requires the adoption of more open-minded attitudes to the kinds of interactive play that could be designed. Current game genres, continually perpetuated, exclude many potential users from participating in a *tacit learning environment* that provides important skills and experience, necessary to interact successfully within contemporary society. *Designing for Inclusivity* should promote a cultural framework within which technology enables the building of interactive play environments that would be socially and technologically advantageous. If we are to use technology to build interactive media that will be socially inclusive, then we need to consider the different interpretations of the *purpose, reason or use*, of the product before we begin to design in any detail. The approach taken in this study illustrates that these factors can only be deduced by accessing users and stakeholders, in order to convert their disparate views, with consideration for the relevant context, into a meaningful concept or representation that allows for inclusion of all factors. The *reason* for the development must remain the top priority throughout the process and should guide this process by setting the boundaries for all detailed content.

Marcuse's claim that technological logic has reduced the 'free faculty of the mind' (Marcuse, 1964, 1991:253) and thereby reduced the gap between *imagination* and *reason*, implies a problem that can be overcome with a more

creative approach to design. This thesis proposes that the inclusive research, design and development approach allows *imagination* and *reason* to exist on common ground within Interactive Digital Play Media.

The utility value of the approach taken in this study, is that it provided an access route to interactive play, and therefore 'liberatory space', based on personal motivation, allowing and promoting wider access to different varieties of play that would provide an arena for confronting and exploring issues of self-development and interaction with others, while acquiring technological competence. Importantly, in an environment of fun or play, learning would be incidental and tacit rather than conscious, although explicit learning could also be included where relevant and desirable. The environment of interactive play is just as ideal for providing models of pro-social behaviour, which could offer alternative behavioural models, as it is to the provision of aggressive, violent and anti-social models that dominate current software game concepts.

Play in a virtual world, where we can simulate real or imaginary situations can help us to explore possible scenarios and gain knowledge about the real world or visualise imaginary or potential worlds, objects or behaviours in a model. This provides an arena for people to explore personal development issues, gain insight and access to new perspectives about themselves and develop skills, experience and competence in dealing with technology, all necessary components for interacting successfully with current and future society and its development.⁵

The *Play Chooser* proposal also provides utility value as a classification model that could map the interactive choices of users. This would allow observation of data relevant to the dynamic nature of user behaviour or preference and would also identify areas in need of development, thus potentially providing valuable information for the application of further inclusive and cross-cultural concept and content design and development. This sort of data would be beneficial to development studios in a different way to the current analysis that is undertaken on the level of sales of software games to different market segments. This study

revealed that many software games that are bought are not necessarily used by only just the purchaser. Instead, they are often shared and loaned among family members and friends or peer groups. A wider perspective is therefore necessary if we are to understand the influence of leisure software and provide an arena of interactive play that serves all motivational objectives, and is regarded as socially beneficial.

An important observation from this study that is worth reiterating is that the perpetuation of current software game genres, excludes many potential users from participating in the tacit learning environment described above.

Designing for Inclusivity promotes a design attitude and cultural framework that encourages the innovation of more widely accessible interactive digital play media, aimed at providing individual, social and technological benefit, development and long term advantage.

5.3 Future Considerations

This research study provided a unique opportunity to investigate the factors influencing the design of leisure software products. The areas identified below, which arose during the research, are considered beneficial to investigate in more detail in the future and promote a more pro-active approach to the design of Inclusive Interactive Digital Media.

The *Play Concept Generation Technique* could be constructively used to establish further empirical research and diagrammatic profiles of both potential and existing user groups. More comprehensive data would enable a mapping of these different profiles using 3D multivariate analysis. The potential of the *Play Chooser* to function both as an *Access Portal to Interactive Play* and as a dynamic data-mapping facility would also be interesting to explore further. Additionally, continual research and development of interface solutions that encourage easy interaction

and enable wider accessibility, participation and competence with technology needs to be encouraged and maintained.

Further investigation of the *play motivators* and *interpretations* would provide more comprehensive and detailed user interpretations that would inform the *taxonomy of play motivators*, providing valuable insight into the potential boundaries of different psychological arenas of play. Additionally, further investigation of character and colour preferences, although shown to be dynamic and context dependent, would establish further empirical data that could suitably inform designers of leisure software and avoid reliance on assumption and stereotyping in this area.

Refining and developing the concept ideas generated by user groups in this study in collaborative research and development projects with professional studios and publishing companies, would enable *Designing for Inclusivity* to be promoted amongst emerging interaction designers and developers, and could even put some unexpected, but desirable new software products on the shelf.

A recent study investigating how children play, and considering the possible impact of television and software games on a child's development, observed the beneficial value of such activities as stress relievers or as stimulatory environments with both children and adults. Observations of software game players led the television documentary⁶ to conclude that this activity enhances decision making, strategic skills and memory capabilities. It also recognised that interactive digital play aided the users ability to resist distraction and focus attention when engaging in other activities outside of the digital media environment. The investigation concluded with the recommendation that the wider the range of experience, the richer lives will be.

The potential of interactive digital media to provide a *tacit social learning environment* should not be underestimated and needs to be encouraged and developed by professional studios, publishers, educators and community groups. It would be particularly interesting to investigate the potential benefits of working

with individuals or groups who have lost interest in current educational practices, on the design and use of interactive play as an alternative learning resource to encourage social development and technological competence. Designing for the future requires an inclusive attitude and the determination to explore more creative ways to survive the challenge of innovation.

¹ Electronic Arts, Chertsey, Surrey, UK.

² A market segmentation analysis carried out by Continental Research in March 1999.

³ Part of the Creative & Cultural Industries Conference, 6th April, 2004. Organised by Aimhigher, at Kent Institute of Art & Design, Rochester, Kent.

⁴ Versioning – the development of different editions of the same game or product. For example; FIFA 2002, FIFA 2003, FIFA 2004 (EA Sports / Electronic Arts)

⁵ Supported by Murray (2000): 'The computer allows us to create objective correlatives for thinking about the many systems we participate in, observe, and imagine. The rules for artificial life forms can be described as a kind of a game, but the knowledge about the world that the model offers us is not gamelike. It is a behavioral artifact that speaks to one of the most profoundly important aspects of our lives.' (Murray, 2000:93)

⁶ By Professor Robert Winston – "Child of Our Time" – transmitted 11/01/2005 BBC1.

Appendix 1.1

Appendices

KENT INSTITUTE OF ART & DESIGN QUESTIONNAIRE Female Leisure Interests January 2000

The purpose of this questionnaire is to carry out research into female leisure interests. Any information provided by you will remain confidential and any analysis of data will preserve anonymity.

1. How old are you? _____
2. What are your personal interests?

3. What are your leisure interests?

4. What would you buy with £30.00? (Please place in order of preference)
 a) _____
 b) _____
 c) _____
 d) _____
 e) _____
5. Do you play games of any sort? (sports, board, computer, other)
 YES / NO (Please tick one box)

Appendix 1.1

Questionnaire – Leisure Interests

KENT INSTITUTE OF ART & DESIGN
QUESTIONNAIRE
Female Leisure Interests
January 2000

The purpose of this questionnaire is to carry out research into female leisure interests. Any information provided by you will remain confidential and any analysis of data will preserve anonymity.

- 1. How old are you:
- 2. What are your personal interests?
.....
.....
.....
.....
.....
- 3. What are your leisure interests?
.....
.....
.....
.....
.....
- 4. What would you buy with £30.00? (Please place in order of preference)
a).....
b).....
c).....
d).....
e).....
- 5. Do you play games of any sort? (sports, board, computer, other)
YES / NO (please circle answer)
- 6. If your answer to question 5 is YES, please specify what games you play?
.....
.....
.....
.....
.....

13. Do you have any ideas about your future career or occupation?

7. How often do you play the above games? (please tick one option)

- Every day?
- Once or twice per month?
- Once or twice per week?
- Less often?

14. What style(s) of music do you enjoy?

8. Do you prefer to play:

- Solitary games?
- Double or partnered games?
- Group games?

Why do you prefer to play this way ?

.....

.....

9. Please describe what feelings motivate you when playing a game?
(eg: to win, participate, have fun, control, survive, be tested physically or mentally, learn, use a skill, explore, create etc)

.....

.....

.....

.....

.....

10. Do you have access to a personal computer or games console?

YES / NO (please circle answer and specify below what you have access to)

.....

11. Where do you have access to the above?

- Home?
 - School?
 - Elsewhere
- (please specify).....

12. How often do you use the above? (please tick one option)

- Every day?
- Once or twice per week?
- Once or twice per month?
- Less often?
- Never?

12a) What do you use the above for? (Please circle all those that apply)

Word Processing Graphics Internet E-mail Games Music

Other.....

(Please specify)

13. Do you have any ideas about your future career or occupation?

.....
.....
.....

14. What style(s) of music do you enjoy?

.....
.....
.....

15. What magazine(s) or newspapers do you read?

.....
.....
.....

16. Please name your favourite shop(s)?

.....
.....

17. Can you name a well known person who has influenced your life and briefly state why?

.....
.....
.....

18. What is your favourite television programme and/or film?

.....
.....

YOUR NAME:

CLASS:

(This information will only be used to contact you and not for any other purpose)

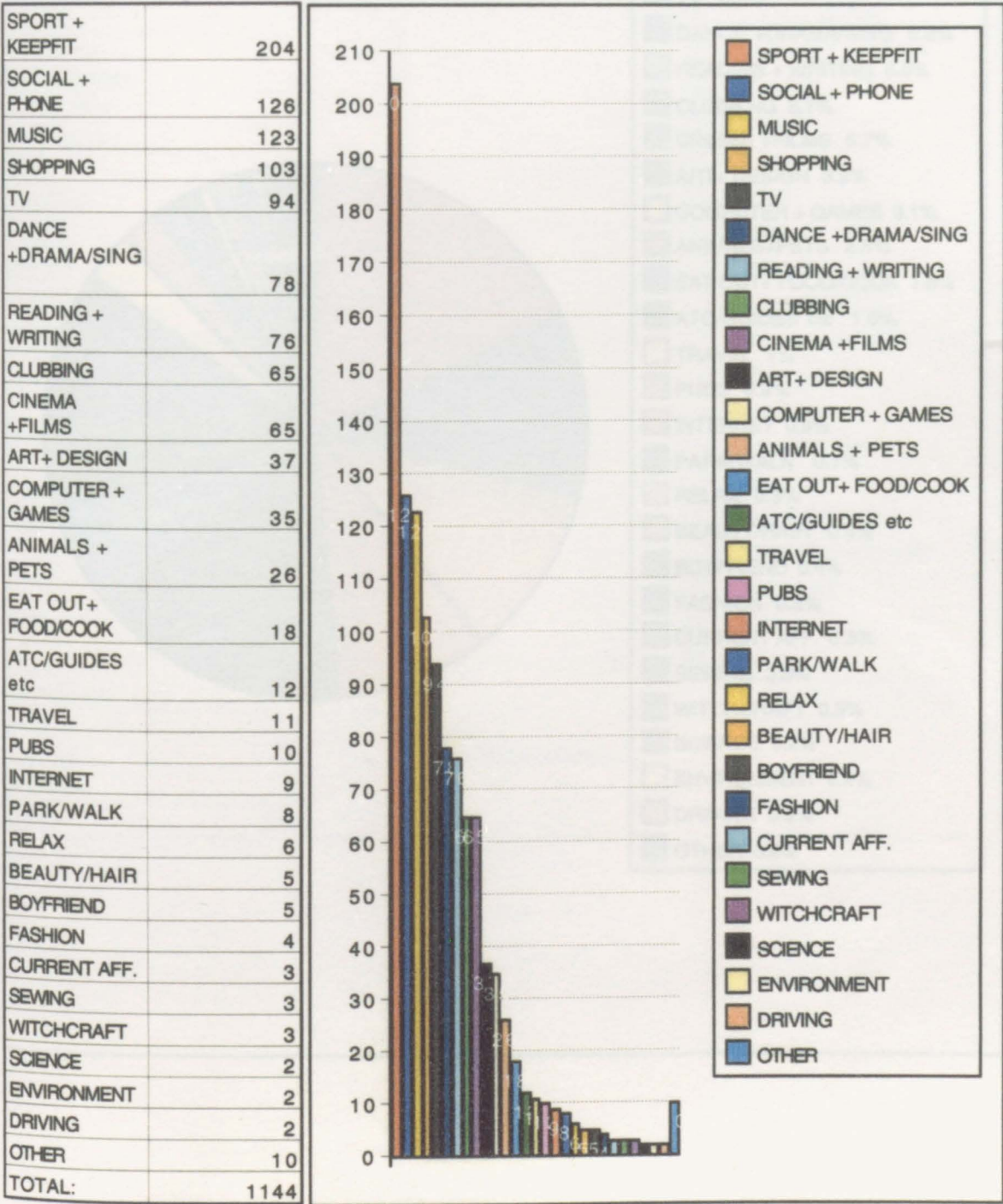
THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.

Susan A. Wilson BA (Hons)
Research & Development Asst,
School of Design.
Kent Institute of Art & Design

Appendix 1.2

Questionnaire Results (Females aged 13-19)

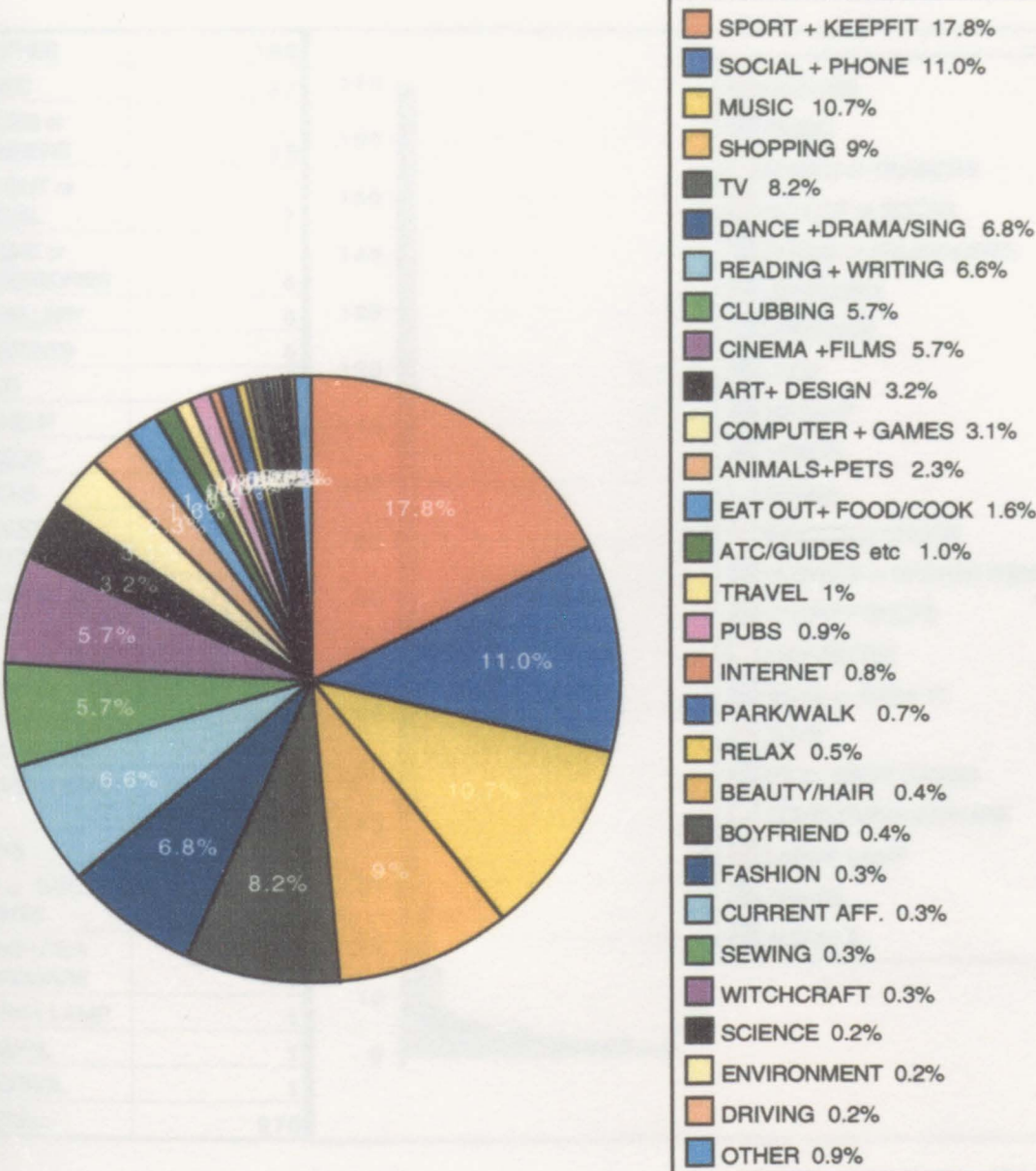
Q.2&3 What are your Personal / Leisure Interests?



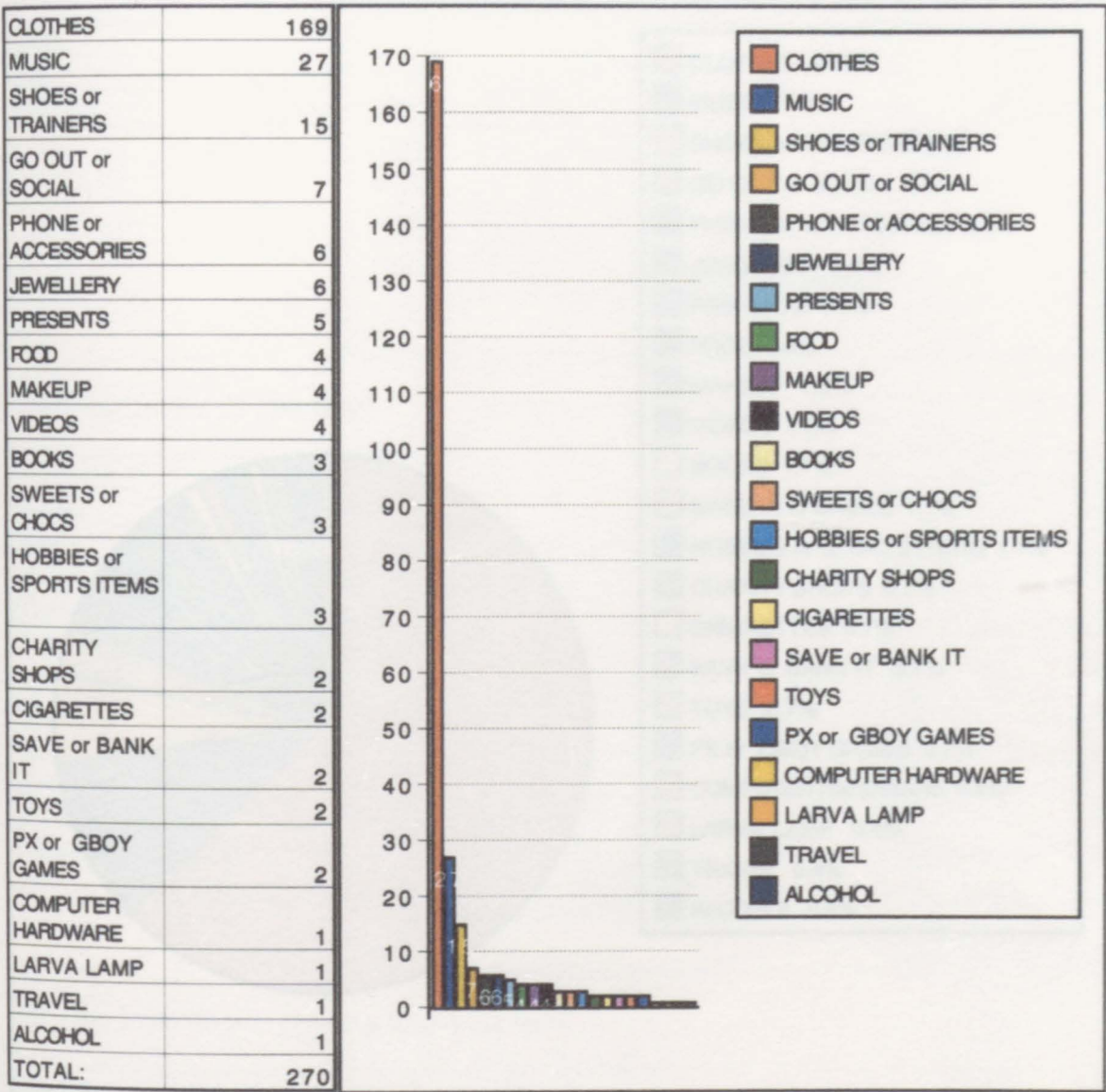
THOSE WITH ONLY 1 VOTE (LISTED AS OTHER):

SEX 1	COLLECTING 1	ASTROLOGY 1	ARCHEOLOGY 1
FLYING 1	HISTORY 1	PSCHOLOGY 1	HOUSEWORK 1
			AROMATHER. 1

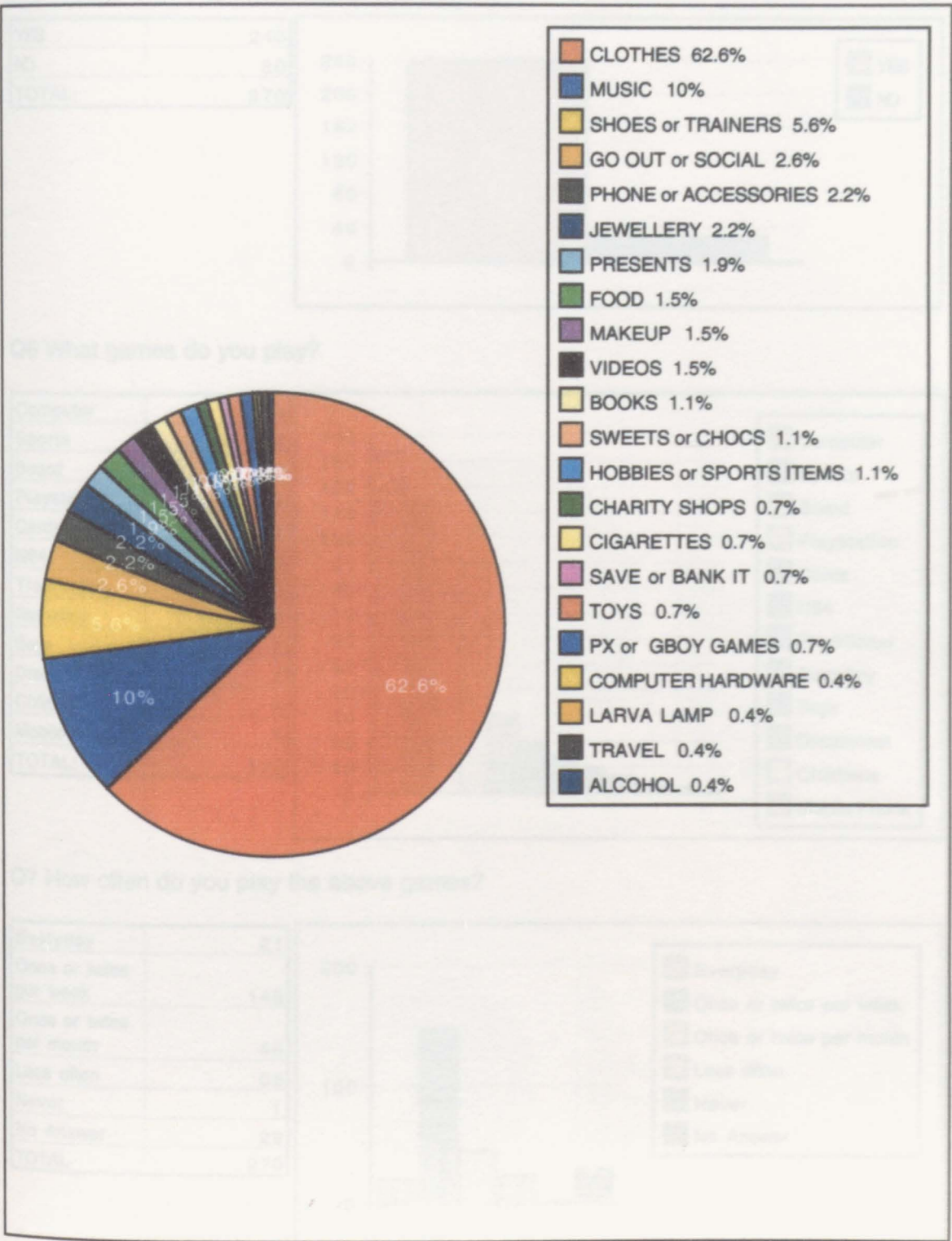
Q.2&3 What are your Personal / Leisure Interests?



Q.4 What would you buy with £30: (First Choice Only)

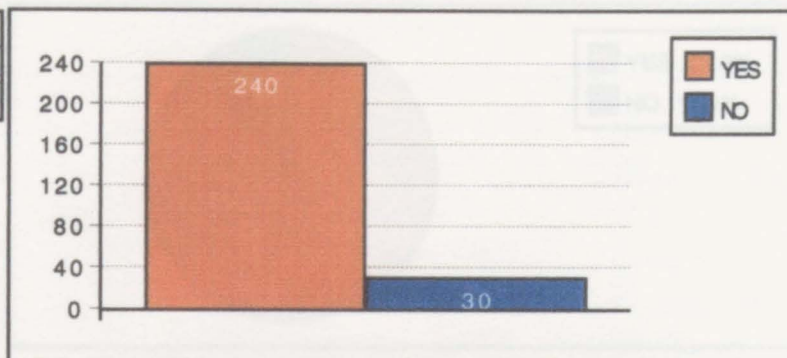


Q.4 What would you buy with £30: (First Choice Only)



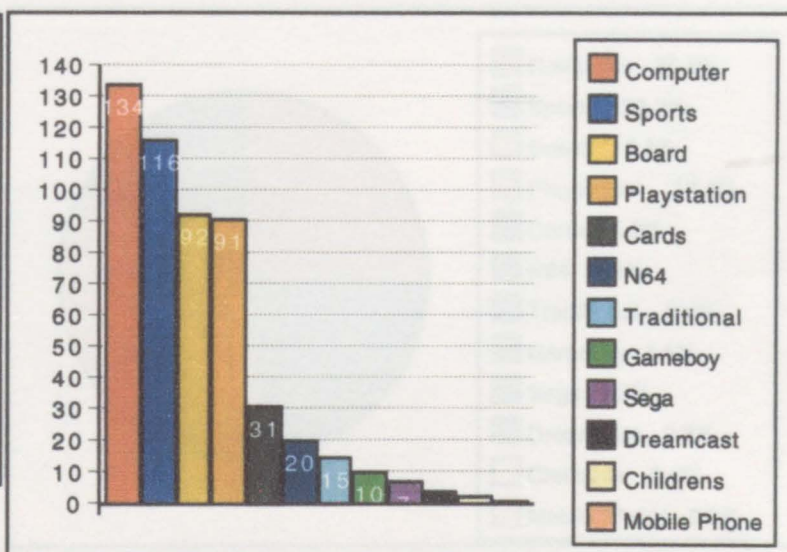
Q5 Do you play games of any sort?

YES	240
NO	30
TOTAL:	270



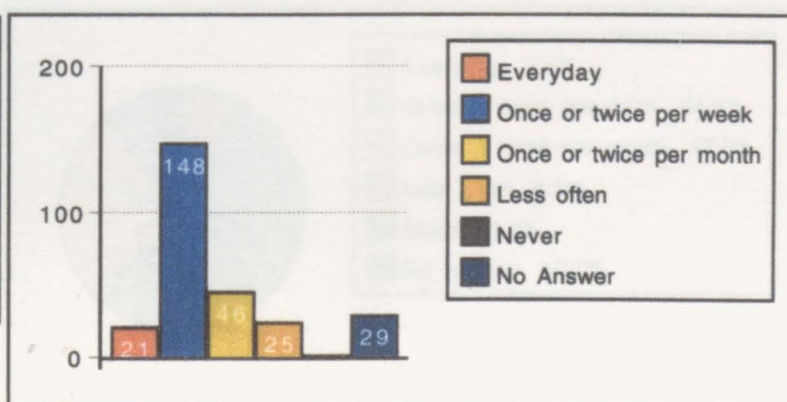
Q6 What games do you play?

Computer	134
Sports	116
Board	92
Playstation	91
Cards	31
N64	20
Traditional	15
Gameboy	10
Sega	7
Dreamcast	4
Childrens	2
Mobile Phone	1
TOTAL:	523



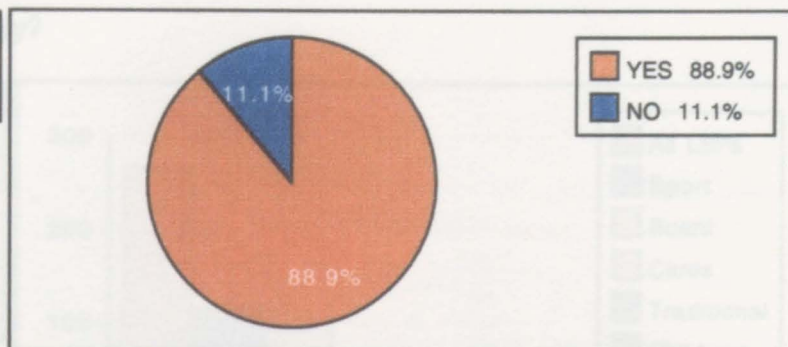
Q7 How often do you play the above games?

Everyday	21
Once or twice per week	148
Once or twice per month	46
Less often	25
Never	1
No Answer	29
TOTAL	270



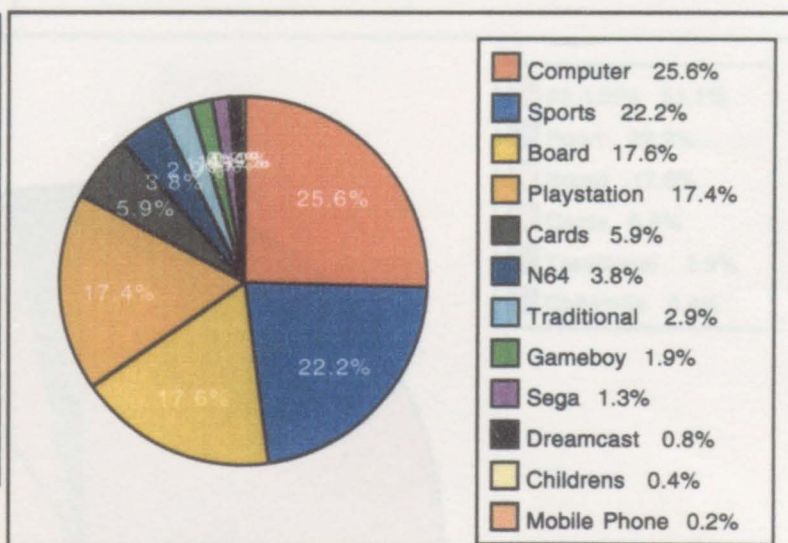
Q5 Do you play games of any sort?

YES	240
NO	30
TOTAL:	270



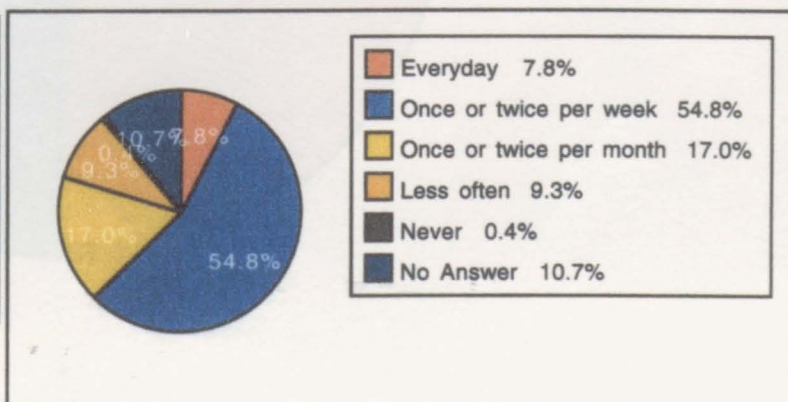
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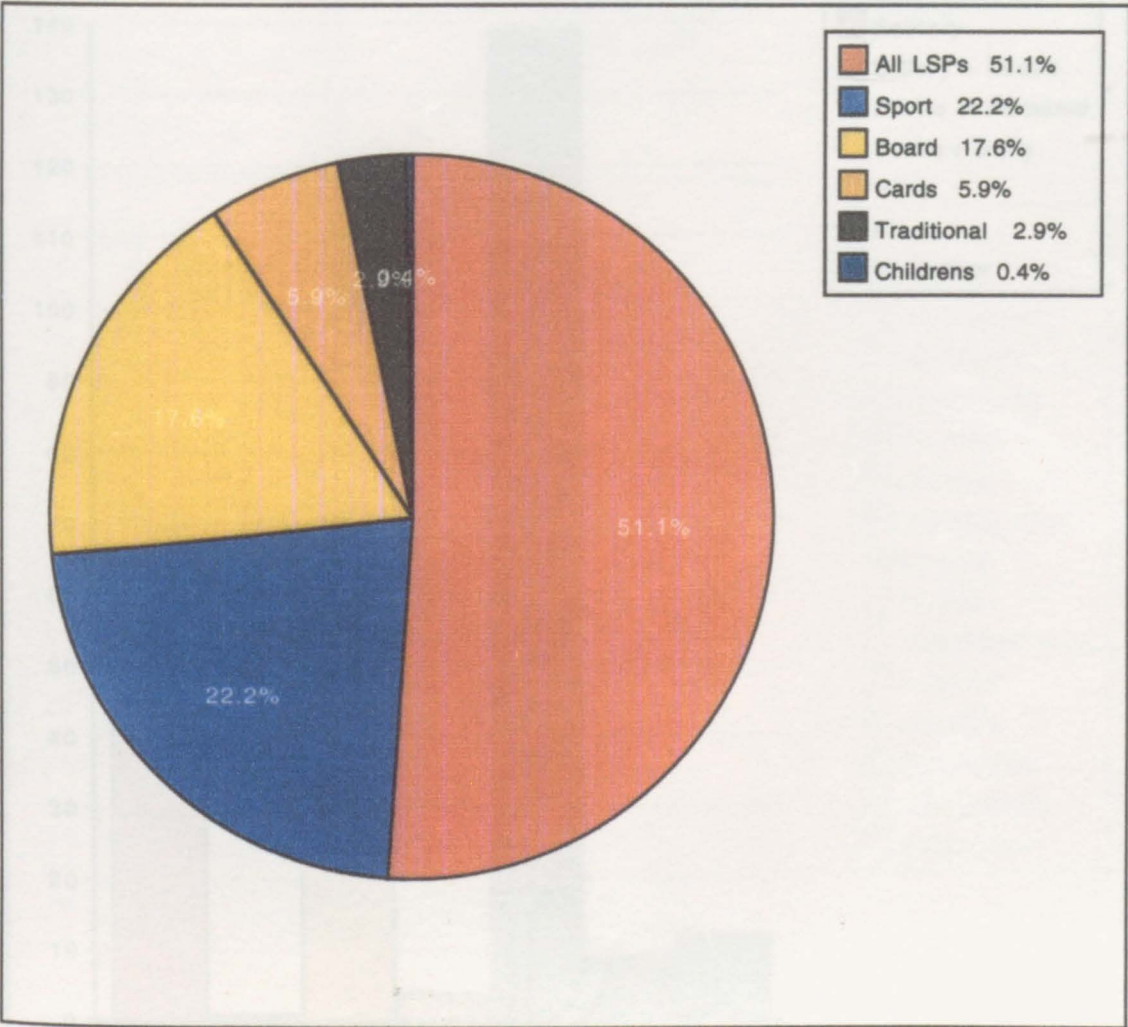
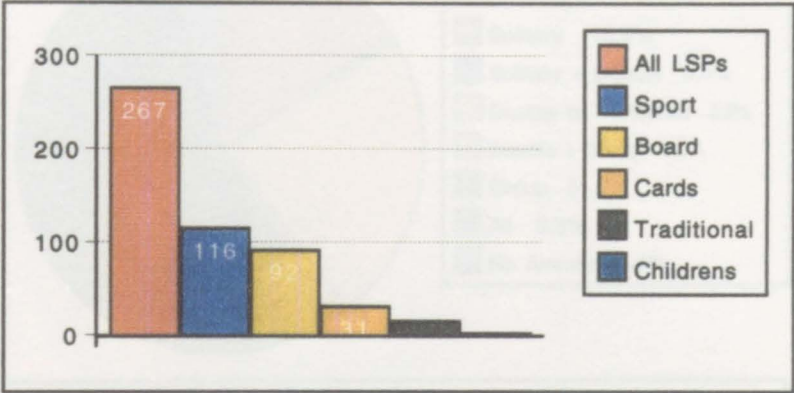


LSP = Leisure Software Products

ADDITIONAL OBSERVATIONS

Q6 What games do you play?

All LSPs	267
Sport	116
Board	92
Cards	31
Traditional	15
Childrens	2
TOTAL	523

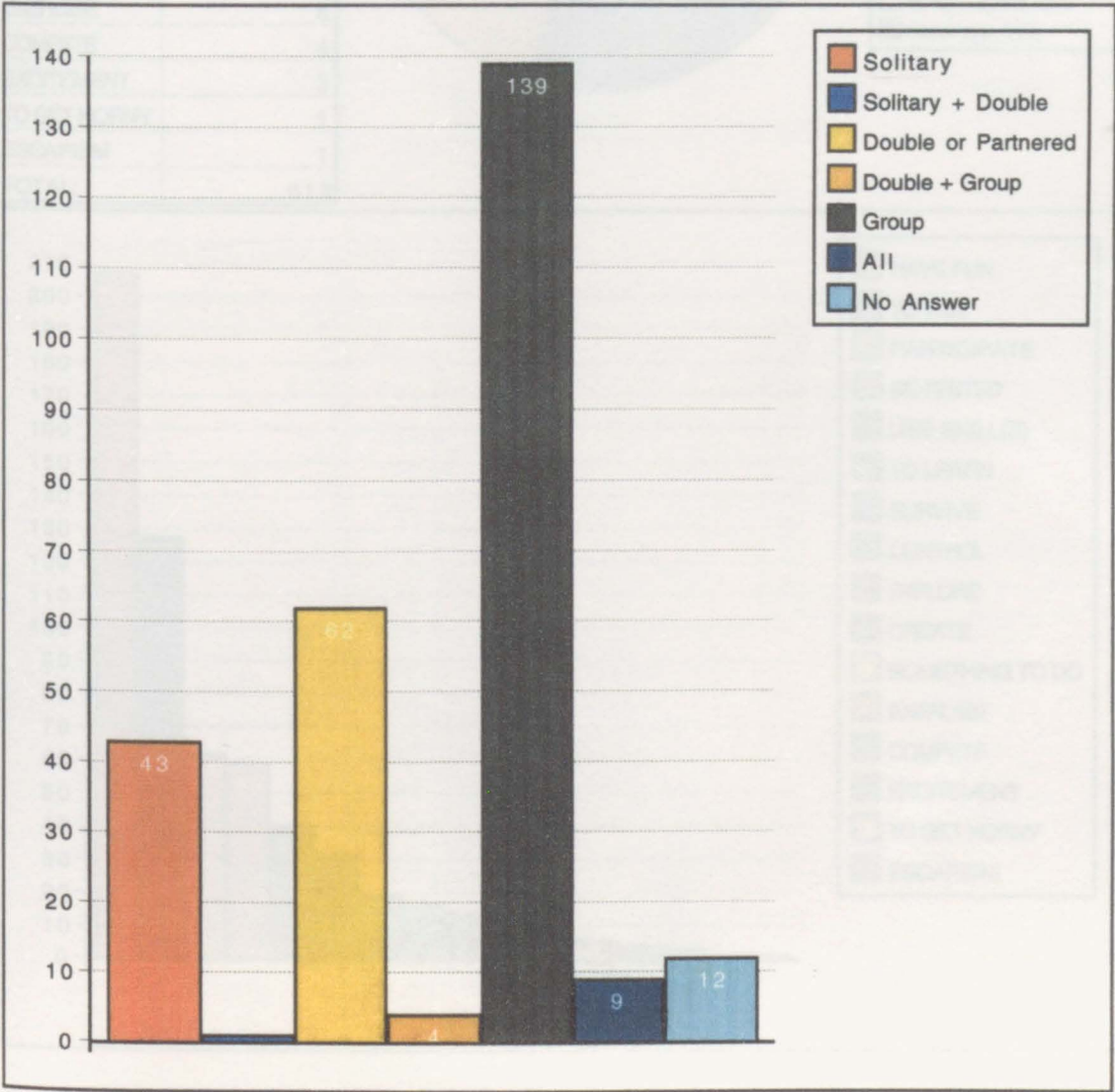
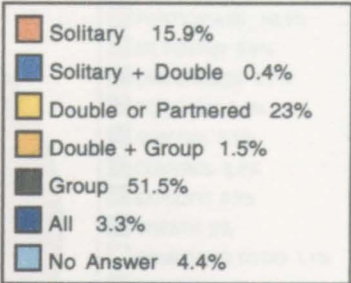
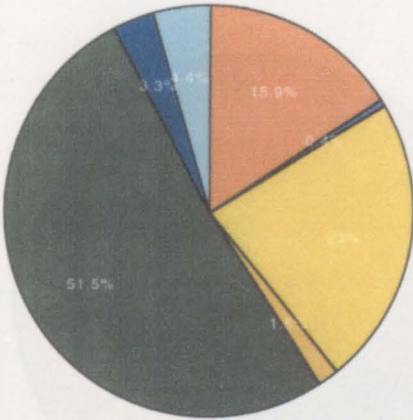


LSP = Leisure Software Products

Q8 What feelings motivate you when playing a game?

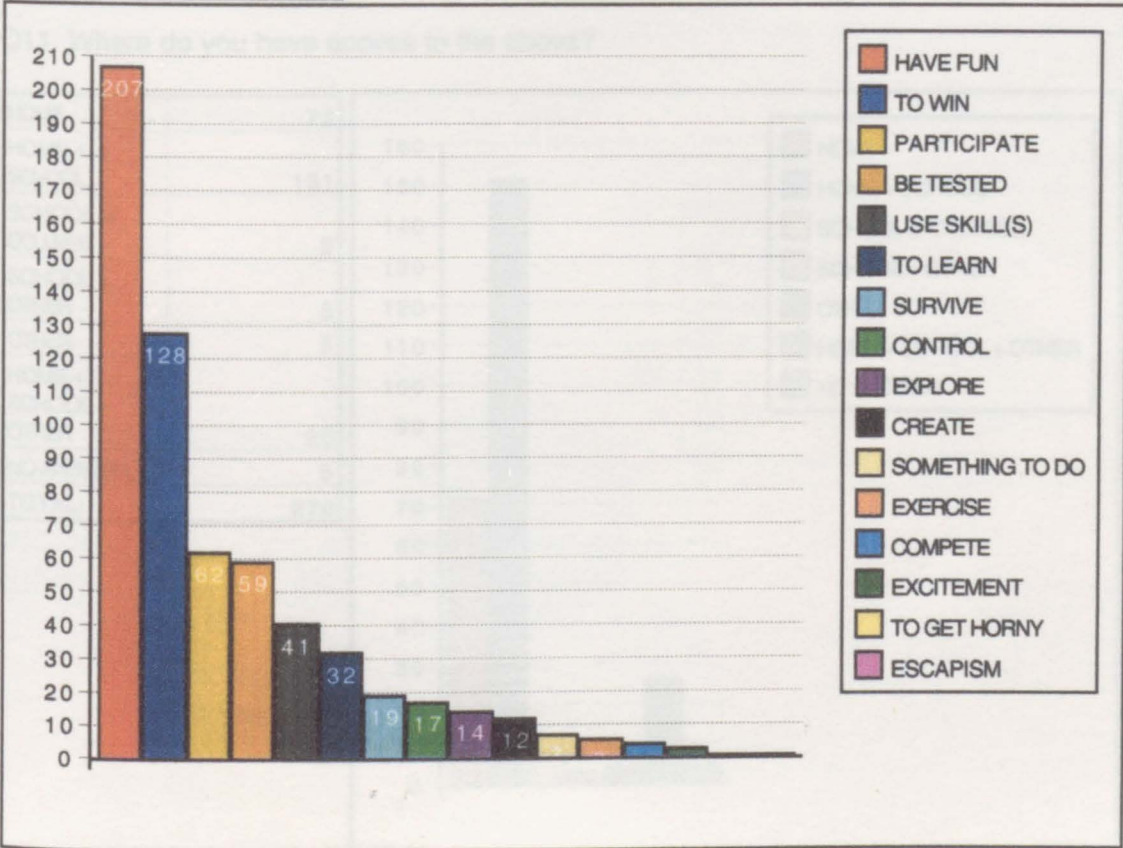
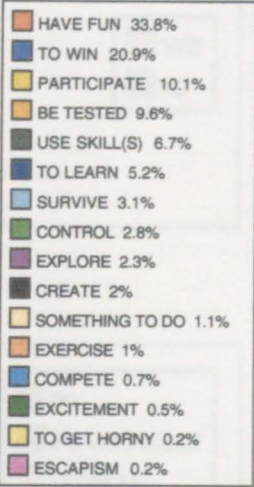
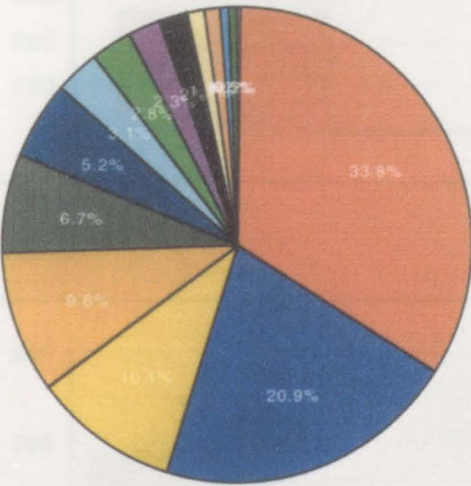
Q8 Do you prefer to play?

Solitary	43
Solitary + Double	1
Double or Partnered	62
Double + Group	4
Group	139
All	9
No Answer	12
TOTAL	270



Q9 What feelings motivate you when playing a game?

HAVE FUN	207
TO WIN	128
PARTICIPATE	62
BE TESTED	59
USE SKILL(S)	41
TO LEARN	32
SURVIVE	19
CONTROL	17
EXPLORE	14
CREATE	12
SOMETHING TO DO	7
EXERCISE	6
COMPETE	4
EXCITEMENT	3
TO GET HORNY	1
ESCAPISM	1
TOTAL:	613



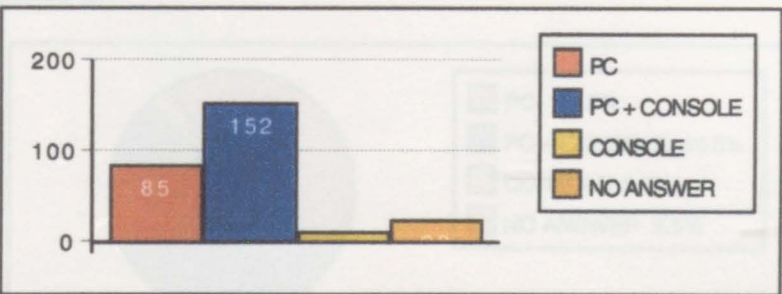
Q10 Do you have access to a personal computer or games console?

YES	264
NO	6
TOTAL:	270



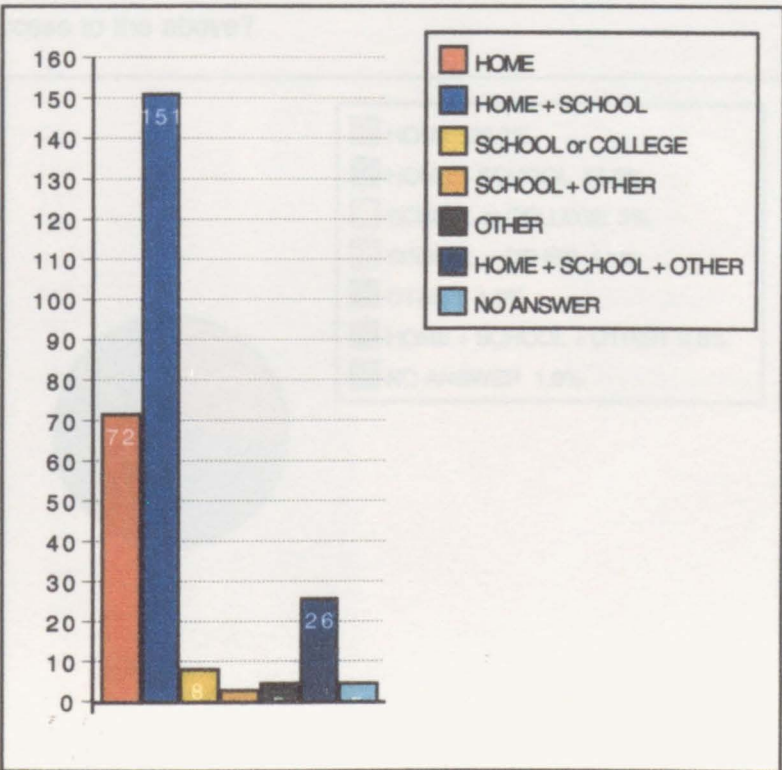
Q10a What do you have access to?

PC	85
PC + CONSOLE	152
CONSOLE	10
NO ANSWER	23
TOTAL:	270



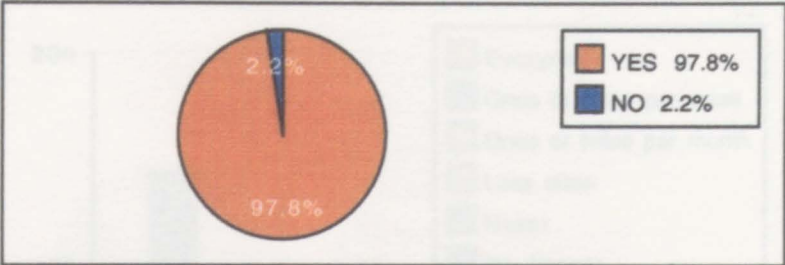
Q11 Where do you have access to the above?

HOME	72
HOME + SCHOOL	151
SCHOOL or COLLEGE	8
SCHOOL + OTHER	3
OTHER	5
HOME + SCHOOL + OTHER	26
NO ANSWER	5
TOTAL:	270



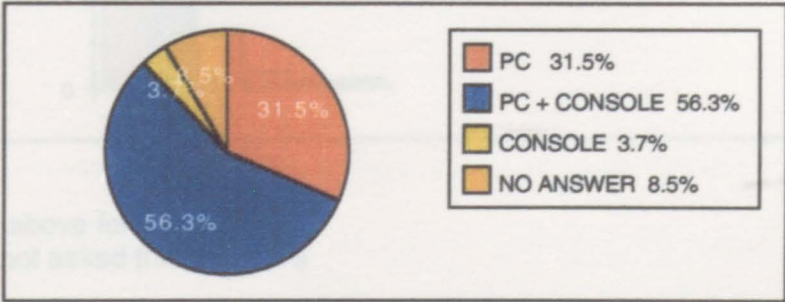
Q10 Do you have access to a personal computer or games console?

YES	264
NO	6
TOTAL:	270



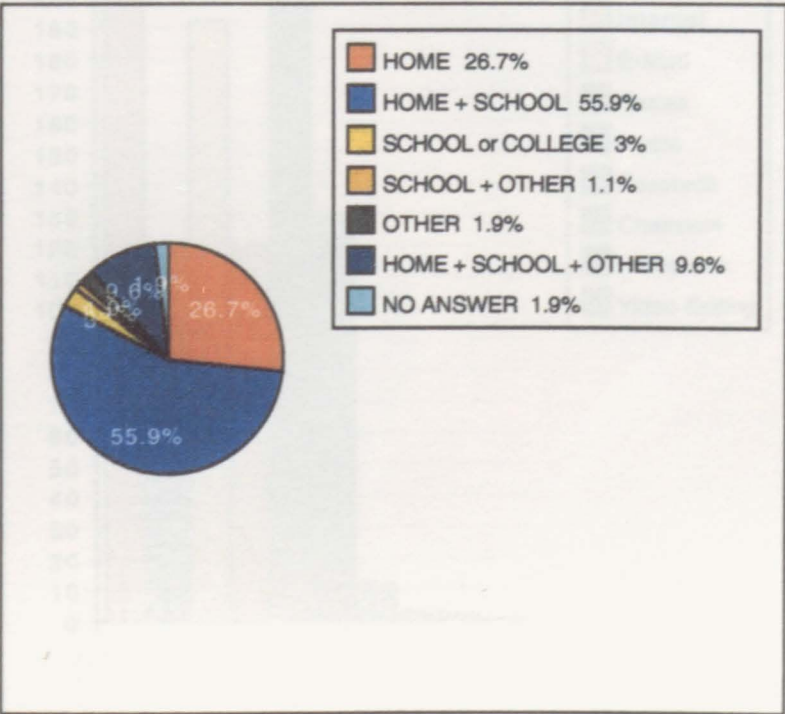
Q10a What do you have access to?

PC	85
PC + CONSOLE	152
CONSOLE	10
NO ANSWER	23
TOTAL:	270



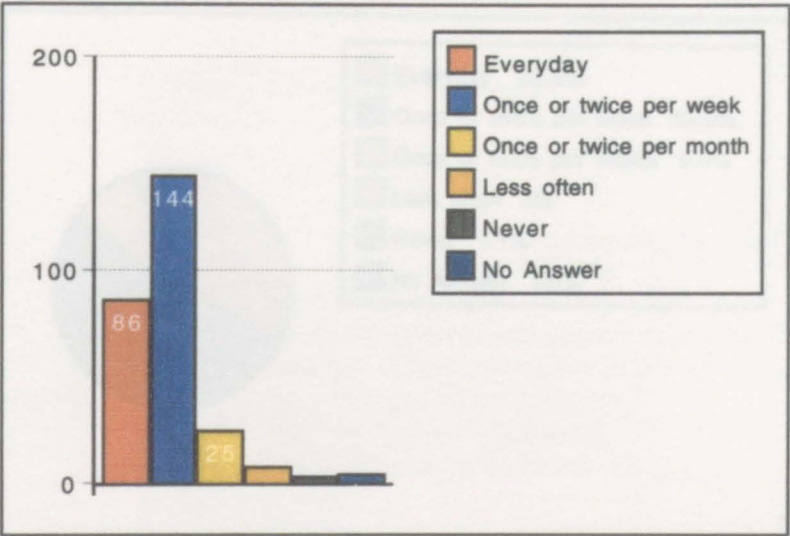
Q11 Where do you have access to the above?

HOME	72
HOME + SCHOOL	151
SCHOOL or COLLEGE	8
SCHOOL + OTHER	3
OTHER	5
HOME + SCHOOL + OTHER	26
NO ANSWER	5
TOTAL:	270



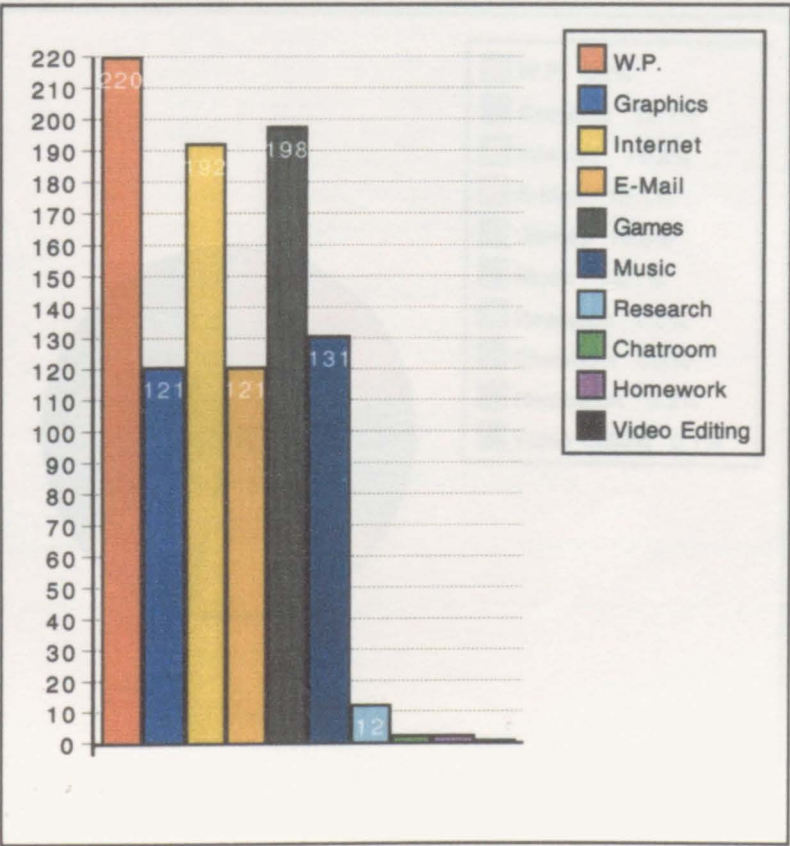
Q12 How often do you use the P.C. or games console you have access to?

Everyday	86
Once or twice per week	144
Once or twice per month	25
Less often	8
Never	3
No Answer	4
TOTAL:	270



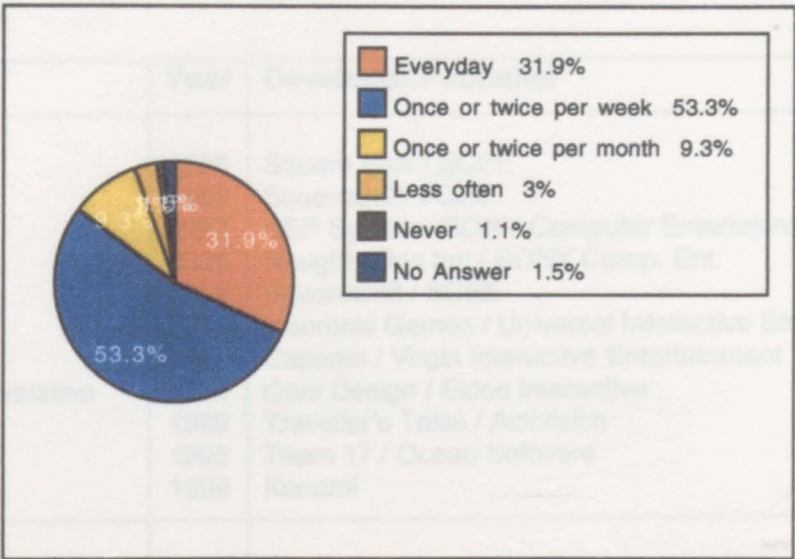
Q12a What do you use the above for?
(N.B. KIAD Students were not asked this question)

W.P.	220
Graphics	121
Internet	192
E-Mail	121
Games	198
Music	131
Research	12
Chatroom	2
Homework	2
Video Editing	1
TOTAL:	1000



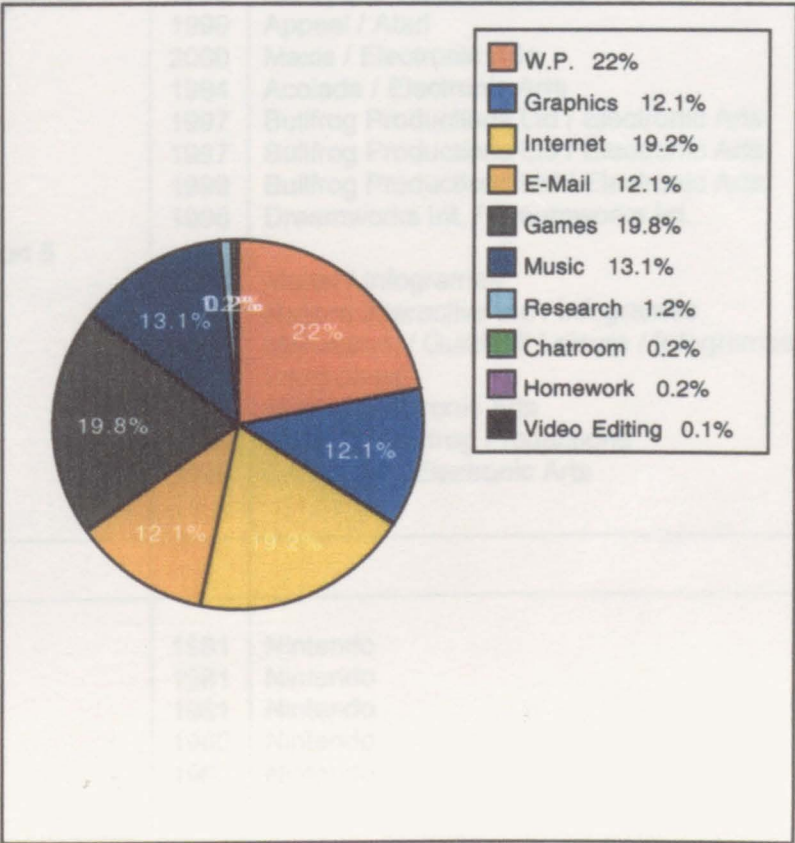
Q12 How often do you use the P.C. or games console you have access to?

Everyday	86
Once or twice per week	144
Once or twice per month	25
Less often	8
Never	3
No Answer	4
TOTAL:	270



Q12a What do you use the above for?
(N.B. KIAD Students were not asked this question)

W.P.	220
Graphics	121
Internet	192
E-Mail	121
Games	198
Music	131
Research	12
Chatroom	2
Homework	2
Video Editing	1
TOTAL:	1000



Appendix 2.1

Games Offered to Focus Groups

For Playstation 1	Year	Developer/Publisher
1. Bustagroove	1998	Square Enix / SCEE
2. Chocobo Racing	1999	SquareSoft/ SCEE
3. Coolboarders	1997	UEP Systems/SONY Computer Entertainment
4. Crash Team Racing	1999	Naughty Dog Inc / SONY Comp. Ent.
5. Final Fantasy VIII	1999	SquareSoft / SCEE
6. Spyro 2	1999	Insomnia Games / Universal Interactive Studio
7. Street Fighter plus Alpha	2000	Capcom / Virgin Interactive Entertainment
8. Tomb Raider – The Last Revelation	1999	Core Design / Eidos Interactive
9. Toy Story 2	1999	Traveller's Tales / Activision
10. Worms	1995	Team 17 / Ocean Software
11. Metal Gear Solid	1999	Konami
For P.C.		
12. Command & Conquer: Tiberian Sun	1999	Westwood Studios / Westwood studios
13. Croc -The Legend of the Gobbos	1997	Argonaut Games / Fox Interactive
14. NBA Live '99 (Basketball game)	1998	EA Sports / Electronic Arts
15. Outcast	1999	Appeal / Atari
16. The Sims	2000	Maxis / Electronic Arts
17. Test Drive 4x4	1994	Acolade / Electronic Arts
18. Theme Hospital	1997	Bullfrog Productions Ltd / Electronic Arts
19. Theme Park	1997	Bullfrog Productions Ltd / Electronic Arts
20. Theme Park World	1999	Bullfrog Productions Ltd / Electronic Arts
21. Trespasser	1998	Dreamworks Int. / Dreamworks Int.
22. The Ultimate Girls Collection 5		
Barbie Ocean Discovery	1997	Mattel / Infogrames
My Little Pony	1999	Hasbro Interactive Inc / Infogrames
My Secret Diary	1999	Manacorn / Guildhall Leisure / Infogrames
Starshot	1999	Infogrames
23. Sim City	1989	Maxis / Electronic Arts
24. Populous	1998	Bullfrog / Bullfrog Productions
25. NHL '99 (Ice Hockey)	1998	EA Sports / Electronic Arts
For Game Boy Colour		
26. Helmet	1981	Nintendo
27. Parachute	1981	Nintendo
28. Chef	1981	Nintendo
29. Vermin	1980	Nintendo
30. Donkey Kong	1982	Nintendo

Appendix 2.2

Game Comment Sheet

Game Title: Your age:

General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: Time Play Ended:

Interface / Ease of Use:

Objective explanation – (Mark out of 10)

Comments:

Character controls – (Mark out of 10)

Comments:

Character Choice: (Mark out of 10)

Comments:

Speed: *I reason did you also playing the game?*

Of Character – (Mark one choice from the following)

Too Fast *Common* Just Right *ari* Too Slow

Of Game – (Mark one choice from the following)

Too Fast Just Right Too Slow

Gameplay / Interaction: (Mark one choice)

Would you buy this game? YES NO

Too Hard *it as a* Just Right Too Easy

Comments:

Graphics: *would you consider spend value for money for this game?*

Packaging:

Intros + Fill in Videos:

Actual Game Graphics:

Sound: *THANK YOU FOR COMPLETING THIS QUESTIONNAIRE*

Speech:

Sound Effects:

Music:

Repeatability:

Within Game:

Of Game itself:

For what reason did you stop playing the game?

Appendix 2.3

Completed Game Comment Sheets

General Comments: (After play)

First choice game from each participant

<u>Would you buy this game?</u>	YES	NO
(Or ask for it as a present)		

How much would you consider good value for money for this game?

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

Susan A. Wilson BA (Hons)
Research & Development Asst.
Kent Institute of Art & Design

Appendix 2.3

Completed Game Comment Sheets

(Packaging / Impression of content / what age level would you place it etc)

First choice game from each participant

Time Game Started: 3.25pm Time Play Ended: 4.21pm

Interface / Ease of Use

Objective explanation - (Mark out of 10) 3/10

Comments: Didn't get an explanation, but wasn't really hard to discover.

Character controls - (Mark out of 10) 9/10

Comments: Very easy to control, sometimes they didn't co-operate though.

Character Choice: (Mark out of 10) 0/10

Comments: Didn't get character choice because you created your own people, which is better.

Speed

Of Character - (Mark one choice from the following)

Too Fast Just Right Too Slow

Of Game - (Mark one choice from the following)

Too Fast Just Right Too Slow

Difficulty / Interaction: (Mark one choice)

Too Hard Just Right Too Easy

Comments: Always kept busy by something.

Graphics

Packaging: Eye catching + bright

Icons + Fill in Videos: Quite good, gave description of game

Actual Game Graphics: Very good

Sound

Speech: The speech is Polishish. Very amusing

Sound Effects: Good

Music: Pleasant theme

Repeatability

Within Game: Wasn't that repetitive at all really

Of Game Itself: I don't know of another game like this

For what reason did you stop playing the game? I had to leave

General Comments: (After play) After a while, the game became quite annoying because you became limited to the things that you could do.

Would you buy the game?

(Or ask for it as a present)

How much would you estimate you'd pay for it?

Comments: (After play)

Participant 1:Game Title: **The Sims** Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Packaging is very appealing. Very good game idea. It is probably for about age 14+Time Game Started: **3.25pm** Time Play Ended: **4.21pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **2/10**Comments: **Didn't get an explanation, but wasn't really hard to discover.**Character controls – (Mark out of 10) **9/10**Comments: **Very easy to control, sometimes they didn't co-operate though.**Character Choice: (Mark out of 10) **0/10**Comments: **Didn't get character choice because you created your own people, which is better.**Speed: (Mark one choice from the following)

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** **Too Slow**Gameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Always kept busy by something.**Graphics: Packaging: **Eye catching + bright**Intros + Fill in Videos: **Quite good, gave description of game**Actual Game Graphics: **Very good**Sound: Speech: **The speech is jibberish. Very amusing**Sound Effects: **Good**Music: **Pleasant themes**Repeatability: Within Game: **Wasn't that repetitive at all really**Of Game itself: **I don't know of another game like this**For what reason did you stop playing the game? **I had to leave**General Comments: (After play) **After a while, the game became quite annoying because you become limited to the things that you can do. Very good game though. Great idea.**Would you buy this game? **YES** **NO**

(Or ask for it as a present)

How much would you consider good value for money for this game? **£20**

Participant 2:Game Title: **The Sims** Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Looked 'normal' real family situationTime Game Started: **12.45pm** Time Play Ended: **?pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **10/10**Comments: **A useful tutorial**Character controls – (Mark out of 10) **9/10**Comments: **Very easy and clear**Character Choice: (Mark out of 10) **10/10**Comments: **Easy to create characters, a wide range of choice**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Lots of control over the game**Graphics: **Life like and realistic**Packaging: **Bright and interesting**Intros + Fill in Videos: **Not many but clear**Actual Game Graphics: **Lots of colour but still clear**Sound: Speech: **Adds to imaginary side of the game having characters speaking nonsense.**Sound Effects: **Useful music**Music: **Lots of music**Repeatability: Within Game: **Game can be changed**Of Game itself: **New characters can be easily changed or created.**For what reason did you stop playing the game? **To move onto another game (time limit)**General Comments: (After play) **This game was although imaginary but still had real people with feelings etc.**Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£20**

Participant 3:Game Title: **Chocobo Racing** Your age: **16**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Looks interesting + fun, for all ages.Time Game Started: **4.20pm** Time Play Ended: **4.35pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **8/10**Comments: **A little hard to control but was fun.**Character controls – (Mark out of 10) **4/10**Comments: **Bit hard to steer.**Character Choice: (Mark out of 10) **10/10**Comments: **Had a choice of some fun characters.**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Got hard at times**Graphics: Packaging: **Good, nice**Intros + Fill in Videos: **Good graphics**Actual Game Graphics: **Good. I like the scenery changes.**Sound:Speech: **A little**Sound Effects: **Animals**Music: **Challenging**Repeatability: Within Game:

Of Game itself:

For what reason did you stop playing the game? **End of session**General Comments: (After play) **It was fun but a little too slow for me**Would you buy this game? YES NO(Or ask for it as a present) **YES**How much would you consider good value for money for this game? **£30**

Participant 4:Game Title: **Spyro 2** Your age: **15**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Actually picked 'The Sims' as first choice, but someone else already playing it!**Chose this one for cute packaging and attractive colours.**Time Game Started: **4.20pm** Time Play Ended: **?pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **7/10**Comments: **Collect jewels + kill lizards**Character controls – (Mark out of 10) **7/10**Comments: **It doesn't always go the way you want**Character Choice: (Mark out of 10) **8/10**Comments: **cute**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Cute that they talk**Graphics: **Sweet**

Packaging:

Intros + Fill in Videos:

Actual Game Graphics:

Sound:

Speech:

Sound Effects:

Music:

Repeatability: Within Game:

Of Game itself:

For what reason did you stop playing the game? **Had to go home.**General Comments: (After play)Would you buy this game?**YES****NO**

(Or ask for it as a present)

How much would you consider good value for money for this game?

Participant 5:Game Title: **The Sims** Your age: **15**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: **4.20pm** Time Play Ended: **4.40pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **9/10**Comments: **Easy to pick up**Character controls – (Mark out of 10) **9/10**Comments: **You can get them to do what you want**Character Choice: (Mark out of 10) **8/10**Comments: **You can make your own house layout**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too Easy

Comments:

<u>Graphics:</u>	Packaging:	}	Appealing
	Intros + Fill in Videos:		
	Actual Game Graphics:		

<u>Sound:</u>	Speech:	}	Good
	Sound Effects:		
	Music:		

<u>Repeatability:</u>	Within Game:	}	Yes, definitely
	Of Game itself:		

For what reason did you stop playing the game? **I had to leave**General Comments: (After play)Would you buy this game? **YES** **NO**

(Or ask for it as a present)

How much would you consider good value for money for this game? **£25**

Participant 6:Game Title: **The Sims** Your age: **14**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

13-Adult / packaging grabbed my attention *I am already playing it at home, so let*Time Game Started: **3.55pm** Time Play Ended: **4.47pm** *because it caught my eye at*Interface / Ease of Use: *made character as Crash Bandicoot.*Objective explanation – (Mark out of 10) **10/10** *3.55pm*Comments: **Easy to pick up**Character controls – (Mark out of 10) **10/10**Comments: **you can get them to do what you want**Character Choice: (Mark out of 10) **10/10**Comments: **You can make your own family which is good**Speed: *all choices (Mark out of 10)* **10/10**

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: *Interaction (Mark one choice)*Graphics: Packaging: **Very eye catching***Comments:* Intros + Fill in Videos: **Didn't notice***Graphics:* Actual Game Graphics: **They were very good**Sound: Speech: **Can't hear voices but you don't need to.**Sound Effects: **OK but you don't really need them***Sound:* Music: **OK** *more music than needed*Repeatability: Within Game: *will quite like it*Of Game itself: *enjoys the game*For what reason did you stop playing the game? **Ran out of time**General Comments: (After play) **This game is fantastic. I like it because you control your character in every way.**Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£30-£35***(Or ask for it as a present)**How much would you consider good value for money for another PC game?* **£10-£20**

Participant 7:

Game Title: **Crash Team Racing** Your age: **14**

General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

The Sims would have been first choice, but I am already playing it at home, so let someone else have a go. Chose to have a go on this game because it caught my eye as the main feature is the same character as Crash Bandicoot.

Time Game Started: **3.20pm** Time Play Ended: **3.55pm**

Interface / Ease of Use:

Objective explanation – (Mark out of 10) **8/10**

Comments: **Not very clear at the beginning**

Character controls – (Mark out of 10) **9/10**

Comments: **Quite clear instructions**

Character Choice: (Mark out of 10) **7/10**

Comments: **Not a very good choice / selection**

Speed:

Of Character – (Mark one choice from the following)

Too Fast Just Right Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Gameplay / Interaction: (Mark one choice)

Too Hard **Just Right** Too Easy

Comments: **A bit boring.**

Graphics: Packaging: **10/10 quite attractive**

Intros + Fill in Videos: **7/10 quite boring**

Actual Game Graphics: **7/10 not very clear**

Sound: Speech: **7/10 more music than speech**

Sound Effects: **9/10 quite fun effects**

Music: **7/10 is always the same**

Repeatability: Within Game: **5/10 not much at all**

Of Game itself: **5/10 not much at all**

For what reason did you stop playing the game? **Was quite boring**

General Comments: (After play) **Found the game boring. Was very clear instructions and there wasn't much to do.**

Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£15.99 - £20**

Participant 8:Game Title: **The Sims** Your age: **13**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Looks interesting, used lots of colours. About different people & what they do. 10+Time Game Started: **?pm** Time Play Ended: **?pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **8/10**Comments: **It was quite easy to use**Character controls – (Mark out of 10) **9/10**Comments: **You can control all the characters, and you can control what they do.**Character Choice: (Mark out of 10) **9/10**Comments: **You can choose all the characters you want & I like the idea that you can make your own up.**Speed: **Just Right**

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Packaging**Graphics: Packaging: **bright and bold**Intros + Fill in Videos: **good**Actual Game Graphics: **They were good with good detail**Sound: Speech: **It is alright**Sound Effects: **they were quite good**Music: **got a bit annoying after a while**Repeatability: Within Game: **didn't really repeat**Of Game itself: **won't repeat unless you do it the same**For what reason did you stop playing the game? **I had to stop because my mum came!**General Comments: (After play) **it was a good game and I would probably buy it. The graphics are good although the sound could be better.**Would you buy this game? **YES** **NO**

(Or ask for it as a present)

How much would you consider good value for money for this game? **£25**

Participant 9:Game Title: **Crash Team Racing** Your age: **13**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

12-15 and up. Easy to put in.Time Game Started: **4.20pm** Time Play Ended: **?pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **6/10**

Comments:

Character controls – (Mark out of 10)

Comments: **it says fast but it isn't**Character Choice: (Mark out of 10) **8/10**

Comments:

Speed:

Of Character – (Mark one choice from the following)

Too Fast Just Right **Too Slow**

Of Game – (Mark one choice from the following)

Too Fast Just Right **Too Slow**Gameplay / Interaction: (Mark one choice)Too Hard Just Right **Too Easy**Comments: **At first it's hard and then it is easy**Graphics: Packaging:

Intros + Fill in Videos:

Actual Game Graphics:

Sound: Speech: **not all that good**Sound Effects: **alright**Music: **a bit annoying**Repeatability: Within Game: **going over and over again and can only do one game at first**

Of Game itself:

For what reason did you stop playing the game? **To choose another one**General Comments: (After play) **Alright – not that good.**Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game?

Participant 10:Game Title: **Spyro 2** Your age: **13**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Played partly beforeTime Game Started: **3.55pm** Time Play Ended: **4.15pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **10/10**Comments: *it would be nice to know the size of the game*Character controls – (Mark out of 10) **9/10**Comments: *you can get them to do what you want*Character Choice: (Mark out of 10) **0/10**Comments: **No choice given**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too Easy

Comments:

Graphics: Packaging: **Dull**

Intros + Fill in Videos:

Actual Game Graphics: **Bright, fun**Sound: Speech: *some Graphics*Sound Effects: **Good**Music: **Sounded fun**Repeatability: Within Game: *not time*Of Game itself: **Yes, I would play it again**For what reason did you stop playing the game? **Focus group ran out of time**General Comments: (After play) *Focus group ran out of time*Would you buy this game? **YES** **NO**

(Or ask for it as a present)

How much would you consider good value for money for this game? **£12.99**

Participant 11:Game Title: **Helmet (Gameboy)** Your age: **13**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: **4.20pm** Time Play Ended: **4.21pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **0/10**Comments: **It would be nice to know the aim of the game!**Character controls – (Mark out of 10) **9/10**Comments: **you can get them to do what you want**Character Choice: (Mark out of 10) **0/10**Comments: **There was no choice**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast Just Right Too Slow

I'd get better with practice and it gives a challengeGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too Easy

Comments:

Graphics:

Packaging:

Intros + Fill in Videos:

Actual Game Graphics:

Sound:Speech: **none**Sound Effects: **rare**Music: **all of the time**Repeatability:Within Game: **Bit boring**Of Game itself: **I would play again**For what reason did you stop playing the game? **Focus group ran out of time**General Comments: (After play)Would you buy this game?**YES****NO**

(Or ask for it as a present)

How much would you consider good value for money for this game?**£9.99**

Appendix 2.3

Additional Completed Game Comment Sheets

(Packaging / Impression of content / what age level would you place it at?)

Packaging - Bit boring - would appear more to boys. Picture on box suggest right age - but know it's a 'POPULOUS' type. Age level - 12 & up

Time Game Started: 2.15pm Time/Play Finished:

Introduction / Ease of Use: 4/10

Objective explanation - (Mark out of 10) 4/10

Comments: Writing at the top of the screen was the instructions, but they disappeared too quickly

Character controls - (Mark out of 10) 8/10

Comments: It was quite easy, you only had to just click on them when they were in whatever you like.

Character Choice: (Mark out of 10) 8/10

Comments: You don't get to choose at all, but it wasn't really a problem

Speed Of Character - (Mark one choice from the following)

Too Fast Just Right Too Slow

Of Course - (Mark one choice from the following)

Too Fast Just Right Too Slow

Difficulty / Challenge: (Mark one choice)

Too Hard Just Right Too Easy

Comments: It becomes harder as the game progresses

Graphics: Packaging: Boring

Icons - FS in Videos: Quite good graphics & sounds

Actual Game Graphics: Quite good

Sound: Speech: Perfect, even had different accents

Sound Effects: Great

Music: Didn't notice any

Replayability: Within Game: Not really any replayability at all

Of Game itself: It is a lot like the game 'Doom'

For what reason did you stop playing the game? I had to leave

General Comments: (After play) I had to leave due to being late to school in the morning, it

shows a good impression and didn't really seem to be a problem

What age level is it aimed at?

Or why for it as a person?

How much would you consider paid value for money for this game? 8/10

Participant 1:Game Title: **Command & Conquer – Tiberian Sun**Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Packaging – Bit Boring – would appear more to boys. Picture on box suggest flight sim – but know it's a 'POPULOUS' type. Age level – 13 & upTime Game Started: **3.15pm**Time Play Ended:Interface / Ease of Use:Objective explanation – (Mark out of 10) **4/10**Comments: **Writing at the top of the screen was the instructions, but they disappeared to quickly**Character controls – (Mark out of 10) **8/10**Comments: **It was quite easy, you only had to just click on them once then more to wherever you like.**Character Choice: (Mark out of 10) **0/10**Comments: **You don't get to choose at all, but it wasn't really a problem**Speed: Of Character – (Mark one choice from the following)Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **It becomes harder as the game progresses**Graphics:Packaging: **Boring**Intros + Fill in Videos: **Quite good graphics & sounds**Actual Game Graphics: **Quite good**Sound:Speech: **Perfect, even had different accents**Sound Effects: **Great**Music: **Didn't notice any**Repeatability:Within Game: **Not really any repeatability as such**Of Game itself: **It is a lot like the game 'Dune'**For what reason did you stop playing the game? **I had to leave**General Comments: (After play) **I had neck ache due to being ingrossed in the game. It made a good impression and didn't really want to turn it off**Would you buy this game?**YES****NO**

(Or ask for it as a present)

How much would you consider good value for money for this game?**£15**

Participant 1:

Game Title: **Coolboarders 2** Your age: **17**

General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Bit boring, but I've played the first one so it may be quite good 7+

Time Game Started: **4.05pm** Time Play Ended: **4.50pm**

Interface / Ease of Use:

Objective explanation – (Mark out of 10) **8/10**

Comments: **You just have to score the most points**

Character controls – (Mark out of 10) **4/10**

Comments: **You have to be a master to know all the moves**

Character Choice: (Mark out of 10) **6/10**

Comments: **You get a few characters to choose from and you can change their clothes aswell**

Speed: Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Gameplay / Interaction: (Mark one choice)

Too Hard **Just Right** Too Easy

Comments: **Some tracks are easy, some are very hard**

Graphics: **Quite good**

Packaging: **A bit boring, not eye catching**

Intros + Fill in Videos: **Not very interesting really**

Actual Game Graphics: **Okay, nothing special**

Sound: Speech: **Clear but repetitive**

Sound Effects: **Not many**

Music: **Quite good, different.**

Repeatability: Within Game: **Not that much really.**

Of Game itself: **Well there has been the first one which is a sequel.**

For what reason did you stop playing the game? **I ran out of time.**

General Comments: (After play) **Okay game, but not very exciting. Good to play probably if there was 2 people playing.**

Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£25.00**

Participant 1:

Game Title: **Metal Gear Solid** Your age: 17

General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Looks quite interesting, packaging is a bit boring. Loos like 15+

Time Game Started: **3.00pm** Time Play Ended: **3.55pm**

Interface / Ease of Use: **Mark out of 10**

Objective explanation – (Mark out of 10) **4/10**

Comments: **Mission is not very clear**

Character controls – (Mark out of 10) **6/10**

Comments: **Quite good controls and functions**

Character Choice: (Mark out of 10) **0/10**

Comments: **Don't get one**

Speed: Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast Just Right **Too Slow**

Gameplay / Interaction: (Mark one choice)

Too Hard Just Right Too Easy

Comments: **very hard. You have to really think about everything deeply**

Graphics: Packaging: **A bit simple and boring.**

Intros + Fill in Videos: **Video's are very good.**

Actual Game Graphics: **Okay**

Sound: Speech: **Very clear**

Sound Effects: **Good because you have to listen to them.**

Music: **Didn't notice any really**

Repeatability: Within Game: **Very repetitive because the first level is so hard that you are forever playing the first level.**

Of Game itself: **It's like fade to black but better graphics.**

For what reason did you stop playing the game? **I got fed up with trying to complete the first level.**

General Comments: (After play) **Not very impressed with the challenge. Very hard to play.**

Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£30.00**

Participant 1:Game Title: **Toy Story 2** Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: **3.45pm** Time Play Ended: **4.40pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **2/10**Comments: **There wasn't really one main objective. There was a few different missions**Character controls – (Mark out of 10) **4/10**Comments: **The character was always turning over when I pressed a direction button.****This became frustration.**Character Choice: (Mark out of 10) **0/10**Comments: **Didn't get a character choice**Speed: Of Character – (Mark one choice from the following)**Too Fast** Just Right Too Slow

Of Game – (Mark one choice from the following)

Too Fast Just Right **Too Slow**Gameplay / Interaction: (Mark one choice)**Too Hard** Just Right Too EasyComments: **Tasks too difficult for a beginner. Became tedious having to retry tasks.**Graphics: Packaging: **Very eye catching.**Intros + Fill in Videos: **Videos were excellent graphics, just like the actual film**Actual Game Graphics: **Not too bad. Not really what I expected**Sound: Speech: **Not much, but clear and understandable**Sound Effects: **Okay**Music: **Annoying because of its repetitiveness**Repeatability: Within Game: **The tasks were very similar in the levels**Of Game itself: **I can't link this game to anything but it certainly isn't the one of its kind**For what reason did you stop playing the game? **I became fed up with having to keep attempting the same tasks**General Comments: (After play) **My first impression was that it was a good game. Now I wouldn't play this again. The first level was too hard**Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£20.00**

Participant 1:Game Title: **The Ultimate Girls Collection 5 - Starshot**Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: **3.45pm**Time Play Ended: **4.10pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **5/10**

Comments:

Character controls – (Mark out of 10) **4/10**

Comments:

Character Choice: (Mark out of 10)

Comments: **Good to have choice, but in this case useless & pointless since can only apparently choose character that accompanies you & have no control over them. More variety would improve this element.**

Speed: Of Character – (Mark one choice from the following)**Too Fast – on mouse** Just Right

Too Slow – on keyboard

Of Game – (Mark one choice from the following)

Too Fast

Just Right

Too Slow

Gameplay / Interaction: (Mark one choice)**Too Hard**

Just Right

Too Easy

Comments:

Graphics: Packaging:Intros + Fill in Videos: **Good**Actual Game Graphics: **Nothing special. Another Sonic!**Sound:Speech: **Clear / can understand**Sound Effects: **Good and useful (especially when can't see round objects!)**Music: **Didn't notice**Repeatability: Within Game:Of Game itself: **Wouldn't attempt again (too hard)**

For what reason did you stop playing the game? **Getting on nerves because too hard to control. Kept getting killed with little chance to escape from enemies.**

General Comments: (After play) **Q. good graphics. Hard to control. Would age it at about 9/10**

Would you buy this game?

YES

NO

(Or ask for it as a present)

How much would you consider good value for money for this game?

Participant 1:

Game Title: **The Ultimate Girls Collection – Barbie Ocean Discovery** Your age: **17**

General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Barbie never really appealed anyway – would age it at about 5-9 yrs old. Would prefer if it was Cindy because (that's what I grew up with) & she's more realistic & British – Barbie too 'perfect' & American. Unsure whether this image of Barbie is meant to be a doll or human! Very unrealistic looking.

Time Game Started: **4.15pm**

Time Play Ended: **5.00pm**

Interface / Ease of Use:

Objective explanation – (Mark out of 10) **3/10**

Comments:

Character controls – (Mark out of 10) **6/10**

Comments:

Character Choice: (Mark out of 10) **0/10**

Comments: **No choice**

Speed: Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Gameplay / Interaction: (Mark one choice)

Too Hard **Just Right** Too Easy

Comments: **Straight forward at beginning. Difficulty increased as you progressed.**

Graphics: Packaging:

Intros + Fill in Videos: **Good**

Actual Game Graphics: **Good**

Sound: Speech: **Too often repeated. Speech didn't go with character (unrealistic)**

Sound Effects: **Good**

Music: **Only vaguely remembers – but do need music in a game**

Repeatability: Within Game:

Of Game itself: **Would attempt again when time on hands to see how far**

you'd get. Probably not within 24 hours though or even a week!

For what reason did you stop playing the game? **Prob. would have cont. but end of session**

General Comments: (After play) **Liked puzzles & problem solving & rewards**

Would you buy this game?

YES

NO

(Or ask for it as a present)

How much would you consider good value for money for this game?

Participant 1:Game Title: **Chocobo Racing** Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Looks quite good because I've played Final Fantasy and enjoyed the racing in that.**Packaging is okay. Probably age 5+**Time Game Started: **3.25pm** Time Play Ended: **4.20pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **8/10**Comments: **It tells you the objective in the title really**Character controls – (Mark out of 10) **7/10**Comments: **Some characters are easier to control better than others**Character Choice: (Mark out of 10) **6/10**Comments: **You have a lot of characters to choose from but I was disappointed as only two of these are Chocobos**Speed: Of Character – (Mark one choice from the following)Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **It depends on which tracks you choose, how hard it becomes.**Graphics: Packaging: **A bit simple. Gives the impression that the characters are all chocobo's**Intros + Fill in Videos: **Video at beginning is very good and funny**Actual Game Graphics: **Quite good. Nothing special**Sound: Speech: **Wasn't any**Sound Effects: **Not that many either, but okay.**Music: **Same song but using different instruments for different tracks. Very annoying.**Repeatability: Within Game: **Very because you are very limited with tracks and characters.**Of Game itself: **Very much like Super Mario cart**For what reason did you stop playing the game? **I got fed up with the same tracks. Lost interest in winning**General Comments: (After play) **Not very impressed. A very small, limited game. I'm glad I didn't buy it before I played it**Would you buy this game? **YES** **NO**

(Or ask for it as a present)

How much would you consider good value for money for this game? **£20.00**

Participant 2:Game Title: **Tomb Raider – The Last Revelation**Your age: **17**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Had heard about it & brother plays it a lot!Time Game Started: **1.15pm** Time Play Ended: **1.30pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **9**Comments: **Easy to follow instructions**Character controls – (Mark out of 10) **7**Comments: **Too overactive**Character Choice: (Mark out of 10)Comments: **Only one character**Speed:

Of Character – (Mark one choice from the following)

Too Fast **Just Right** Too Slow

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Easy instructions but harder too control**Graphics:

Packaging:

Intros + Fill in Videos: **Lots of films**Actual Game Graphics: **Clear and exact graphics**Sound:Speech: **Lots of instructions**Sound Effects: **Lots of speech and music**

Music:

Repeatability: Within Game: **Lots of new things to do**Of Game itself: **Different scenes**For what reason did you stop playing the game? **Ran out of time**General Comments: (After play) **Lots of music and speech. Felt like you were part of the game**Would you buy this game?**YES****NO**

(Or ask for it as a present)

How much would you consider good value for money for this game?**£15**

Participant 3:Game Title: **Coolboarders 2** Your age: **16**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

all ages, looks challenging.Time Game Started: **4.40pm** Time Play Ended: **4.50pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **9/10**Comments: **Easy when figured it out**Character controls – (Mark out of 10) **8/10**Comments: **A little hard at first**Character Choice: (Mark out of 10) **10/10**Comments: **Love the choice to dress them differently**Speed:

Of Character – (Mark one choice from the following)

Too Fast Just Right **Too Slow**

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too Easy

Comments:

Graphics: Packaging: **Good**Intros + Fill in Videos: **Interesting**Actual Game Graphics: **I like the graphics**Sound: Speech: **All the way through very good**Sound Effects: **yes, when you did something good**Music: **really good, works well with game**Repeatability: Within Game:

Of Game itself:

For what reason did you stop playing the game? **End of session**General Comments: (After play) **I liked it and would have liked to play longer**Would you buy this game? **YES** **NO**

(Or ask for it as a present)

How much would you consider good value for money for this game? **Around £35**

Participant 7:Game Title: **Coolboarders 2** Your age: **14**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: **2.30pm** Time Play Ended: **3.00pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **5/10**Comments: **Didn't explain**Character controls – (Mark out of 10) **4/10**Comments: **Character doesn't respond**Character Choice: (Mark out of 10) **6/10**Comments: **A few to choose from**Speed:

Of Character – (Mark one choice from the following)

Too Fast Just Right **Too Slow**

Of Game – (Mark one choice from the following)

Too Fast Just Right **Too Slow**Gameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Some bits were ok**Graphics: Packaging: **6/10 to 8/10 represented the game well**Intros + Fill in Videos: **7/10 not too many**Actual Game Graphics: **6/10 pathway wasn't very clear when****snowboarding**Sound: Speech: **6/10 wasn't much**Sound Effects: **4/10 not very realistic**Music: **7/10 quite good, a bit boring**Repeatability: Within Game: **5/10 wasn't much**Of Game itself: **5/10 wasn't much**For what reason did you stop playing the game? **It became boring**General Comments: (After play) **A good game, but I found it boring**Would you buy this game? YES NO

(Or ask for it as a present)

How much would you consider good value for money for this game? **£15**

Participant 7:Game Title: **Bustagroove** Your age: **14**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

Time Game Started: **4.05pm** Time Play Ended: **5.05pm**Interface / Ease of Use:Objective explanation – (Mark out of 10) **7/10**Comments: **Not any explanation at the beginning**Character controls – (Mark out of 10) **10/10**Comments: **Quite easy (once I got the hang of it)**Character Choice: (Mark out of 10) **10/10**Comments: **A good selection to choose from**Speed:

Of Character – (Mark one choice from the following)

Too Fast ☐ **Just Right** ☒ Too Slow ☐

Of Game – (Mark one choice from the following)

Too Fast ☐ **Just Right** ☒ Too Slow ☐Gameplay / Interaction: (Mark one choice)Too Hard ☐ **Just Right** ☒ Too Easy ☐

Comments:

Graphics: **Packaging: 10/10 Gives a good picture of the game****Intros + Fill in Videos: 10/10****Actual Game Graphics: 10/10**Sound: **Speech: 9/10 quite clear****Sound Effects: 10/10 very good****Music: 10/10 very good**Repeatability: **Within Game: 5/10 not much****Of Game itself: 5/10 not much**For what reason did you stop playing the game? **Ran out of time**General Comments: (After play) **Very good game, excellent graphics and music**Would you buy this game? **YES** ☒ **NO** ☐

(Or ask for it as a present)

How much would you consider good value for money for this game? **£20 - £30**

Participant 9:Game Title: **Tomb Raider – The Last revelation** Your age: **13**General Comments on game before play:

(Packaging / impression of content / what age level would you place it etc)

My brother has got the others and I like the look of itTime Game Started: Time Play Ended:Interface / Ease of Use:Objective explanation – (Mark out of 10) **10/10**

Comments:

Character controls – (Mark out of 10) **8/10**

Comments:

Character Choice: (Mark out of 10)Comments: **I like it and would like to play it again and the others**Speed:

Of Character – (Mark one choice from the following)

Too Fast Just Right **Too Slow**

Of Game – (Mark one choice from the following)

Too Fast **Just Right** Too SlowGameplay / Interaction: (Mark one choice)Too Hard **Just Right** Too EasyComments: **Love it**Graphics: **Great**

Packaging:

Intros + Fill in Videos:

Actual Game Graphics:

Sound:Speech: **Good**Sound Effects: **Good**Music: **Didn't hear any**Repeatability: Within Game:Of Game itself: **Would love to do it again**For what reason did you stop playing the game? **Had to**General Comments: (After play) **Wanted to play more**Would you buy this game?**YES****NO**

(Or ask for it as a present)

How much would you consider good value for money for this game?**£25.99**

Appendix 3.1

Advanced Tool Kit Exercise Sheets

Shigenobu Kobayashi founded the Nippon Colour & Design Research Institute (NCD) in 1966. He has since become a leader in the field of colour psychology. The exercises detailed in this appendix were developed by Kobayashi in 1998 after three years of extensive travel and research. They form part of a simple method to pinpoint personal colour preferences and were utilised during the advanced focus group sessions of this research study in order to determine detailed attribute preferences in relation to leisure software products aimed at potential users in the female 13-19 age group.

1 Color Research

EXERCISE 1 Choosing Your 10 Favorite Colors

Pick 10 colors you like from the 130 colors scattered on this white ground, then choose 5 colors you dislike. Make a list of the numbers you have selected, then go to the hue and tone system on pages 8-9.

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Exercise 1 – Select 10 Colours from a selection of 130 and identify 5 that are disliked from the same selection.

EXERCISE 2 Choosing 20 Words You Like

There are 180 “image words” below. Look at them carefully and then choose 20 words you like, marking them.

Database Image Research (Taste)

- | | | | |
|-----------------------------|---------------------------------|-----------------------------|------------------------------|
| 1. vigorous | 46. naive | 91. steady | 136. innocent |
| 2. happy | 47. generous | 92. mannish | 137. jovial |
| 3. open | 48. casual | 93. strong & robust | 138. simple, quiet & elegant |
| 4. pretty | 49. lighthearted | 94. shrewd & astute | 139. intense |
| 5. tidy & neat | 50. jaunty | 95. spirited | 140. noble & elegant |
| 6. distinguished | 51. childlike | 96. neat | 141. quiet |
| 7. friendly | 52. supple | 97. sober | 142. substantial |
| 8. emotional | 53. lyrical | 98. manmade | 143. progressive |
| 9. bracing | 54. sporty | 99. clean | 144. precise |
| 10. delicate | 55. simple & appealing | 100. dynamic | 145. manly |
| 11. diligent | 56. exact | 101. alluring | 146. serious |
| 12. intimate | 57. amiable | 102. free | 147. perky |
| 13. colorful | 58. distinctive | 103. feminine | 148. rich & luxurious |
| 14. genuine | 59. captivating | 104. dreamy | 149. tranquil |
| 15. merry | 60. vivacious | 105. intellectual | 150. wild |
| 16. fascinating | 61. tasteful | 106. cozy & comfortable | 151. full of life |
| 17. mellow | 62. elegant | 107. temperate & mild | 152. gentle & elegant |
| 18. unadorned | 63. dignified | 108. brilliant | 153. domestic |
| 19. sweet & dreamy | 64. quiet & tranquil | 109. crystalline | 154. cute |
| 20. clear | 65. old-fashioned | 110. austere | 155. sound |
| 21. elaborate | 66. rational | 111. provocative | 156. refreshing |
| 22. cultured | 67. simple & frugal | 112. heavy & deep | 157. fashionable |
| 23. passionate | 68. sturdy | 113. fresh | 158. sacred |
| 24. speedy | 69. honest & straight - forward | 114. extravagant | 159. pure & simple |
| 25. decorative | 70. majestic | 115. tough | 160. enjoyable |
| 26. cerebral | 71. forceful | 116. urbane | 161. traditional |
| 27. flamboyant | 72. nostalgic | 117. agreeable to the touch | 162. fiery |
| 28. subtle | 73. provincial | 118. peaceful | 163. cultivated |
| 29. fresh & young | 74. earnest | 119. tender | 164. vibrant |
| 30. humorous | 75. refined & comely | 120. romantic | 165. composed |
| 31. vivid | 76. light and pale | 121. antique | 166. lovely |
| 32. energetic | 77. modest | 122. gentle | 167. agreeable |
| 33. revolutionary | 78. animated | 123. lively | 168. charming |
| 34. plain | 79. dignified & graceful | 124. elaborate & delicate | 169. carefree |
| 35. comfortable & laid-back | 80. eminent | 125. healthy | 170. luxurious |
| 36. active | 81. quaint | 126. nonchalant | 171. natural |
| 37. chic | 82. quiet & sophisticated | 127. sharp | 172. pure & genuine |
| 38. refined | 83. womanly | 128. gentlemanly | 173. settled & at ease |
| 39. clear-cut | 84. smart | 129. young | 174. sexy |
| 40. polished | 85. bold | 130. robust | 175. dapper |
| 41. light | 86. maidenly | 131. pastoral | 176. sleek |
| 42. congenial | 87. restful | 132. happy-go-lucky | 177. showy |
| 43. moderate | 88. artistic & tasteful | 133. formal | 178. cheerful |
| 44. mild | 89. metallic | 134. modern | 179. graceful |
| 45. rich | 90. dynamic & active | 135. masculine | 180. youthful |

Exercise 2 – Select 10 Image Words from a selection of 180.

EXERCISE 3 Choosing 8 Color Bars

Select 8 color combinations of 5 colors and check the numbers against the chart on pages 14–15.



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Exercise 3 – Select 5 colour combinations made up of 5 colours together.

EXERCISE 4-2 Choosing Your Favorite Fashion Colors

Pick 5 color combinations for your “fashion color image.”



Exercise 4 – Pick 5 colour combinations of 5 colours together for your ‘fashion colour image’.

EXERCISE 5 Choosing Chairs You Like

Choose 3 chairs you would like to sit on from among these café photographs.

Locations

1. Bordeaux, France	5. Vienna, Austria	9. Cologne, Germany
2. Marseilles, France	6. Charleville Mezieres, France	10. Marseilles, France
3. Caen, France	7. Milan, Italy	11. London, England
4. Dusseldorf, Germany	8. Dusseldorf, Germany	12. Milan, Italy

Exercise 5 – Choose 3 chairs you would like to sit on from a selection of 12 café photographs of chairs / furniture.

EXERCISE 6-1

Photo Research on Streets
Window Displays

Choose the displays you find most appealing. If it helps, pretend you are walking along an international arcade. Many charming displays can be found in the windows of retail shops. Look at the photographs carefully. Can you see how the window's image and color combination are coordinated?



Locations

1. Kobe, Japan
2. Bangkok, Thailand
3. Lyon, France
4. Kassel, Germany
5. Lyon, France
6. Buenos Aires, Argentina
7. Tours, France
8. London, England
9. Paris, France

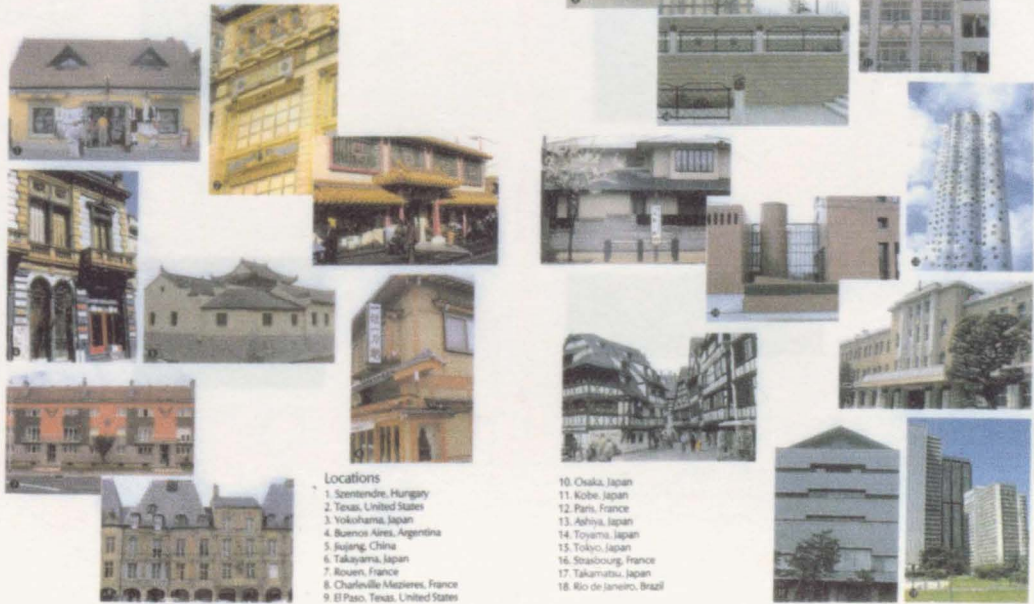
10. Cologne, Germany
11. Vienna, Austria
12. Milan, Italy
13. Kakunodate, Japan
14. Takayama, Japan
15. Mantes-la-Jolie, France
16. Paris, France
17. Seoul, Korea
18. Paris, France

Exercise 6-1 – Choose the 3 window displays that you find most appealing from a range of 18.

EXERCISE 6-2

Photo Research on Streets
Building Façades and Cityscapes

Walking in the city, we can see that buildings have various faces. What kind of buildings do you prefer? Choose 4 and think about a suitable image for them. Then we'll see how that image differs according to country, even when buildings and shops are similar.



Locations

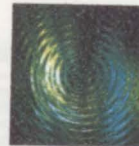
1. Szeged, Hungary
2. Texas, United States
3. Yokohama, Japan
4. Buenos Aires, Argentina
5. Beijing, China
6. Takayama, Japan
7. Rouen, France
8. Charleville-Mazis, France
9. El Paso, Texas, United States

10. Osaka, Japan
11. Kobe, Japan
12. Paris, France
13. Ashiya, Japan
14. Toyama, Japan
15. Tokyo, Japan
16. Strasbourg, France
17. Takamatsu, Japan
18. Rio de Janeiro, Brazil

Exercise 6-2 – Choose the building / cityscapes that you prefer from a range of 18.

Appendix 3.2

Random Image Selection Sheet

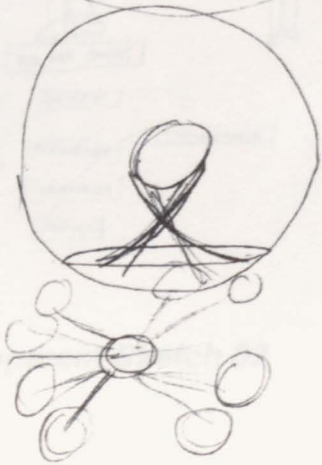
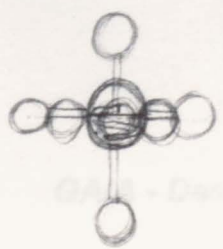
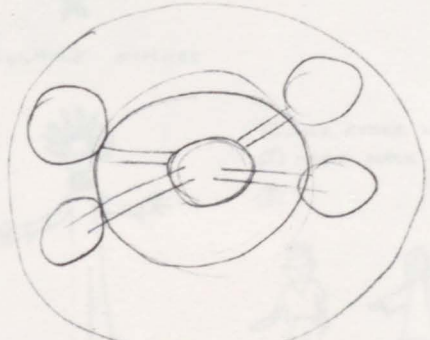
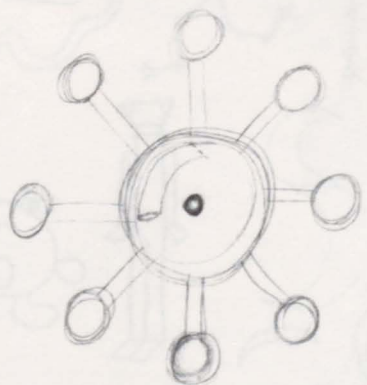
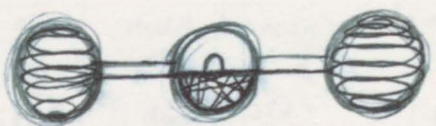
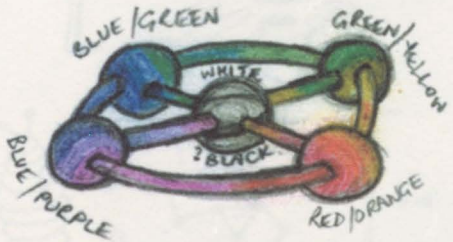
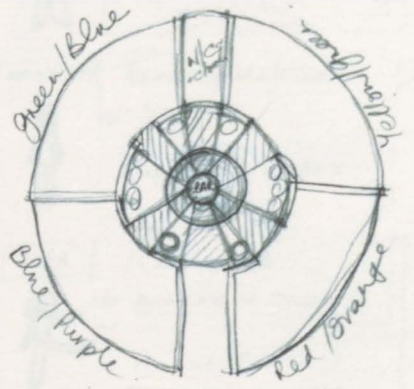


Exercise 7 –Indicate your 1st, 2nd and 3rd choice images from the selection of 8 random images of abstract, natural and geometric forms.

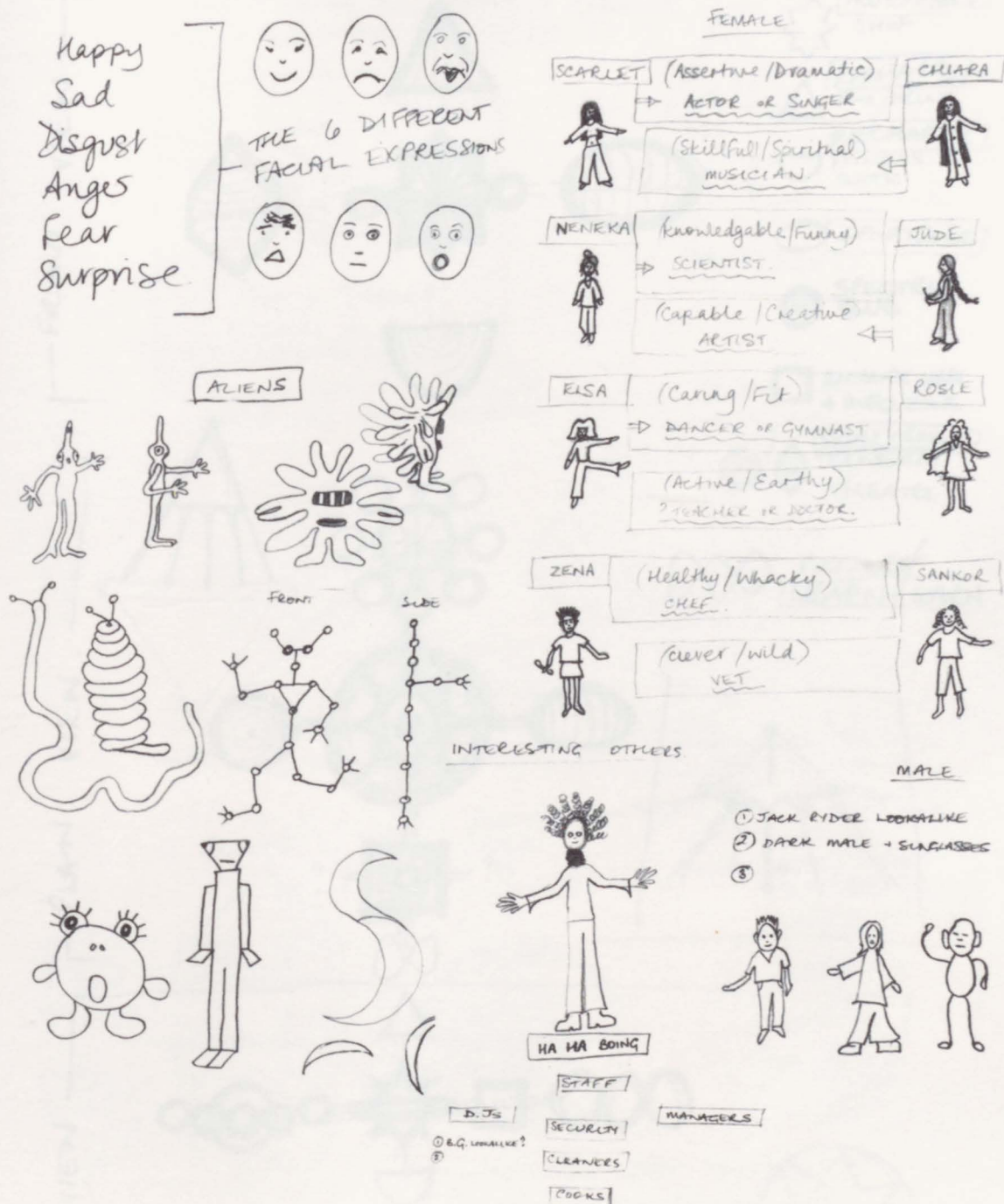
Appendix 4.1

Design Development Sketches of
Product Development Proposal 5

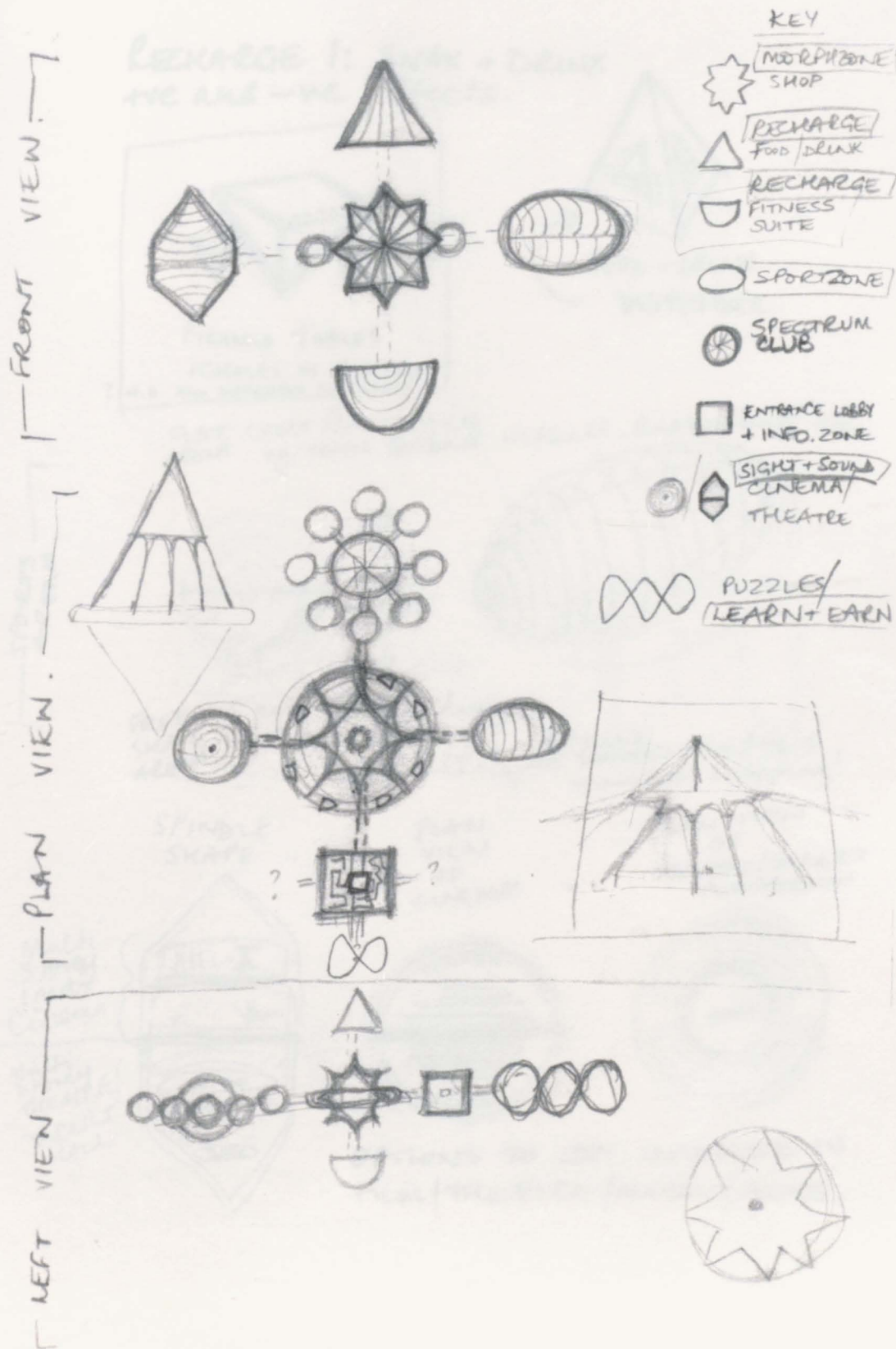
GAIA
VIRTUAL CONTEX. —
SPECTRUM CLUB — EXPLORE
SPORT2 — CHALLENGE
SIGHT + SOUND — CREATE
LEARN + EARN — SURVIVE
MORPHZONE — NOURISH



GAIA - Design Development Sketch 01

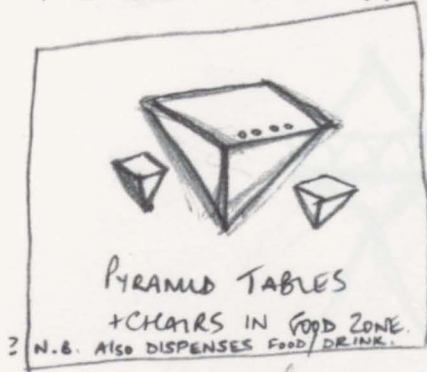


GAIA - Design Development Sketch 02



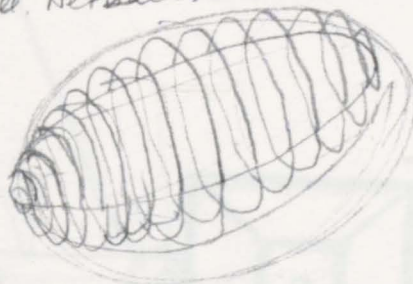
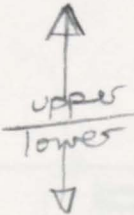
GAIA - Design Development Sketch 03

RECHARGE 1: SNAX + DRINK
+ve and -ve effects.



FLAT COURT/PITCH SPORTS
eg. Tennis, Football, Netball, Basketball etc.

SPORTS
ARENA



FREE
SHAPE
ARENA.

eg. Skateboarding,
iceskating,
Rollerblading

N.B. hire skates &
quicker shopping!

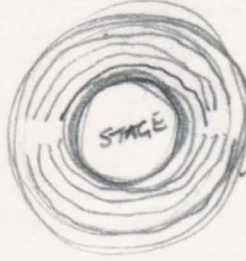
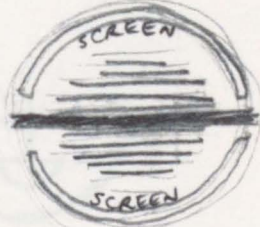
SPINDLE
SHAPE

PLAN
VIEW
OF
CINEMAS

PLAN VIEW
OF
THEATRE/CONCERT
AUDITORIUM.

Multi
Storey
IMAX
Cinema

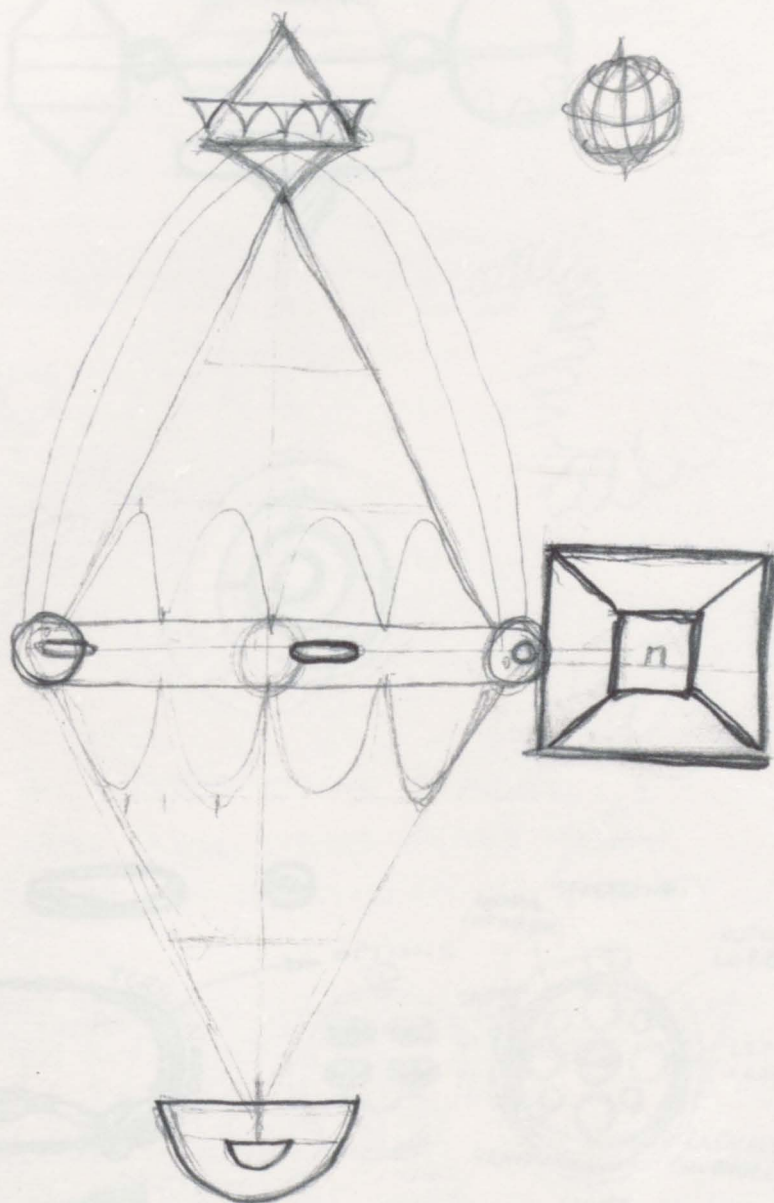
Multi
Storey
THEATRE
CONCERT
HALL



OPTIONS TO GET INVOLVED IN
FILM/THEATRE/MUSIC/ARTS.

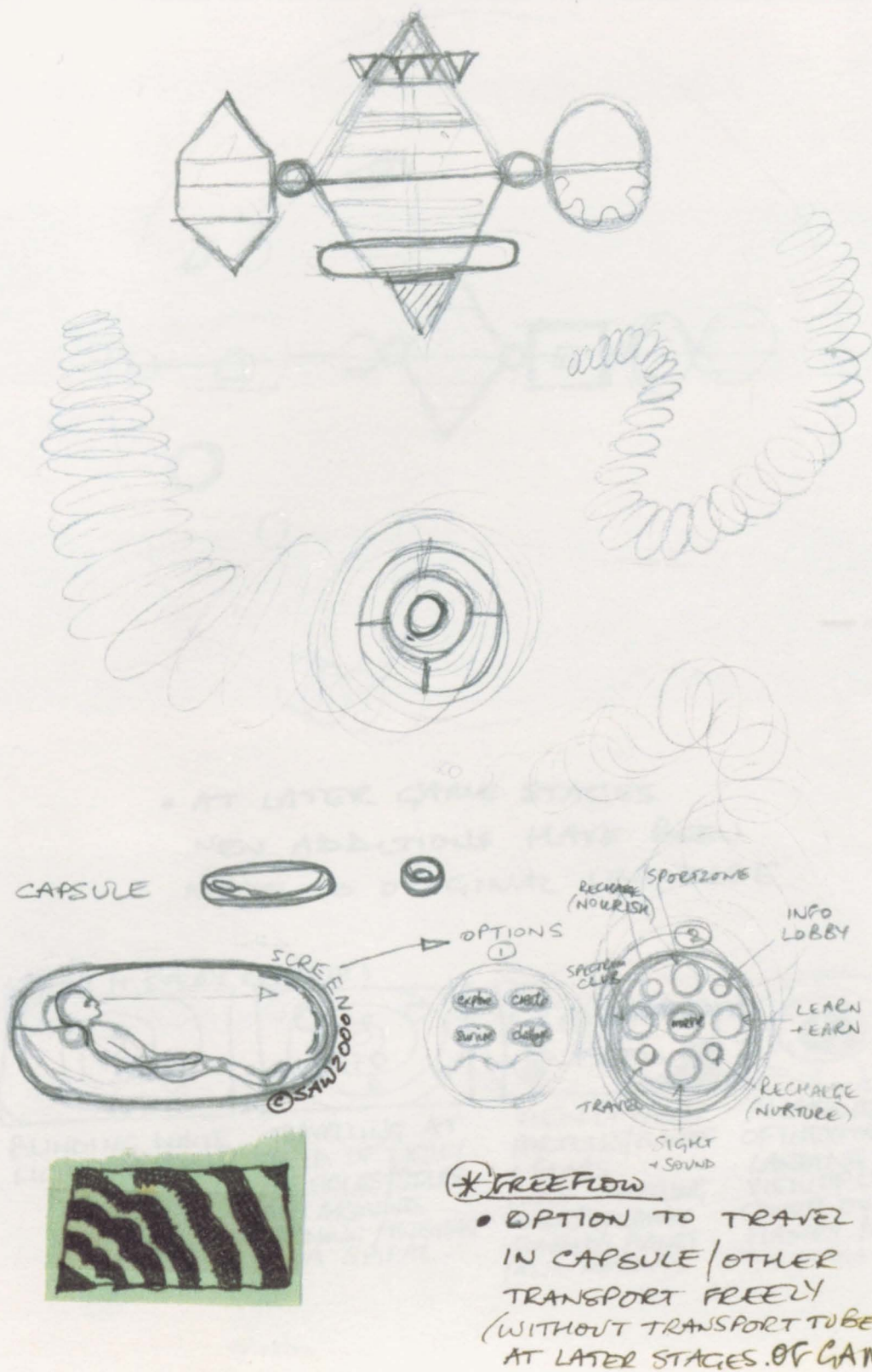
GAIA - Design Development Sketch 04

GYROSCOPE



- OPTIONS FOR PLAYER TO CREATE OWN ENVIRONMENTS + LINK TO ORIGINAL VIA TRANSPORT TUBES / FREE FLOW (* → (see next page)

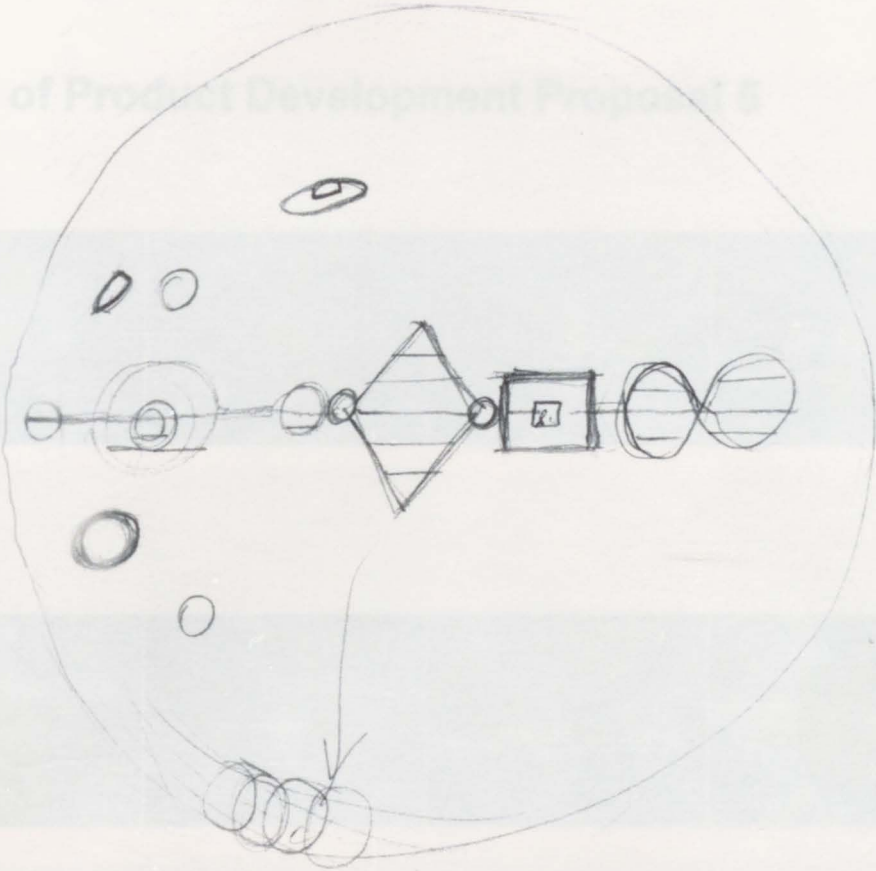
GAIA - Design Development Sketch 05



GAIA - Design Development Sketch 06

Appendix 4.2

Visuals of Product Development Proposal 5



• AT LATER GAME STAGES
NEW ADDITIONS HAVE BEEN
MADE TO ORIGINAL UNIVERSE.

START (+ EVERY REBIRTH)

1
BLINDING WHITE
LIGHT EXPLOSION

2
TRAVELLING AT
SPEED OF LIGHT
PARTICLES/STARS
ALL AROUND.
TURNING/TWISTING
IN A SPIRAL.

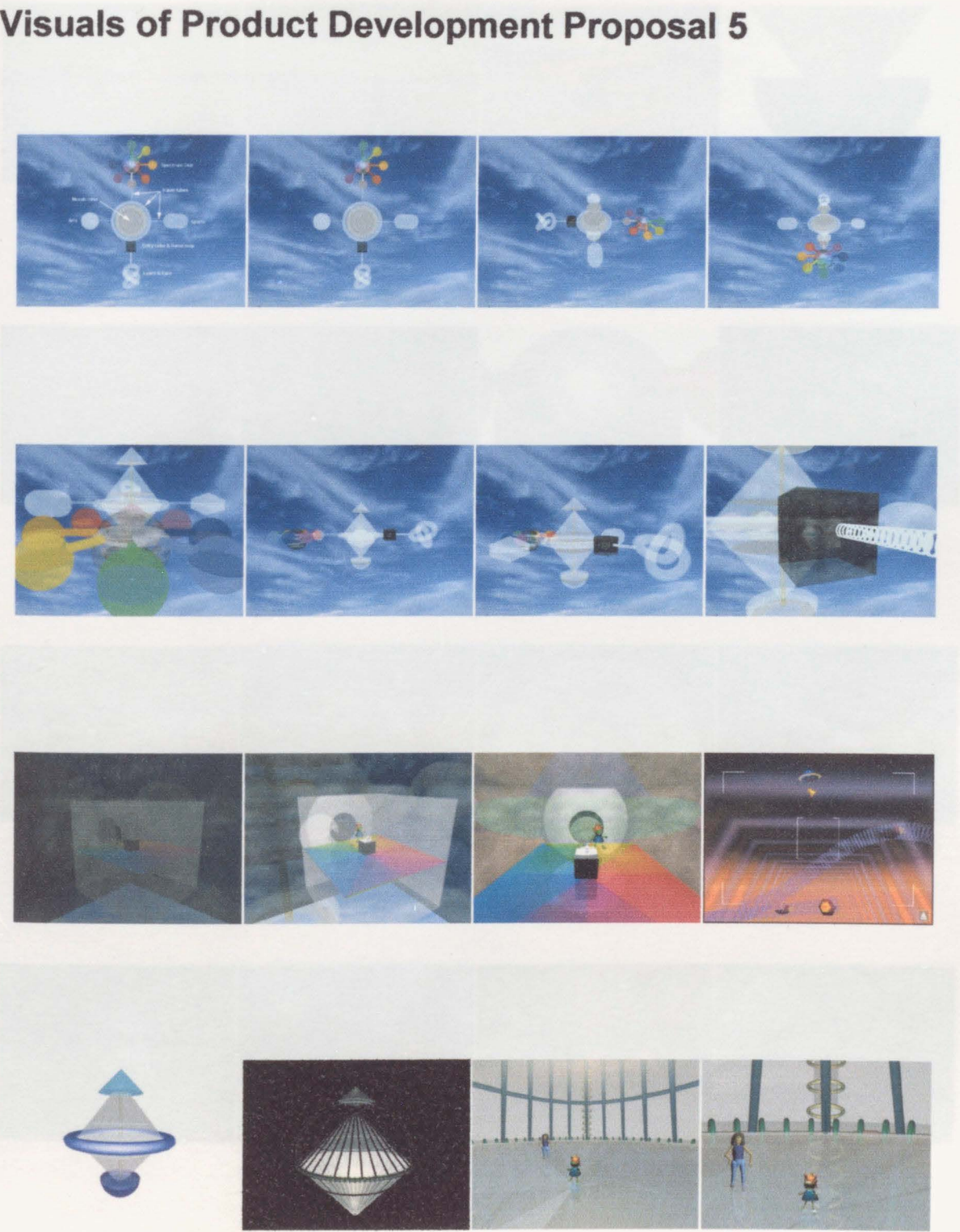
3
VIEW OF LARGER
PARTICLES/PLANETS
+ STARS.
P.O.V. TRAVELLING
INDEPENDENTLY
TOWARDS PLANET
(ALSO MOVING)

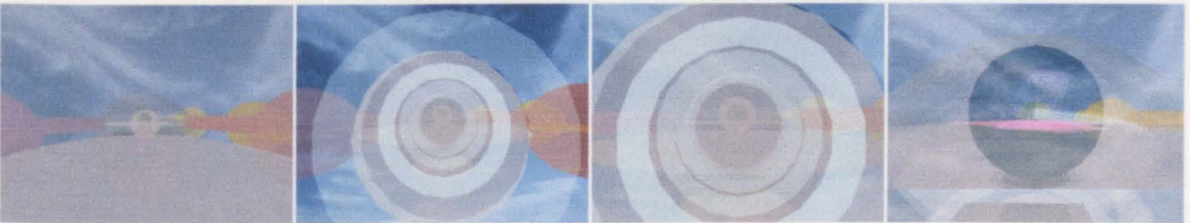
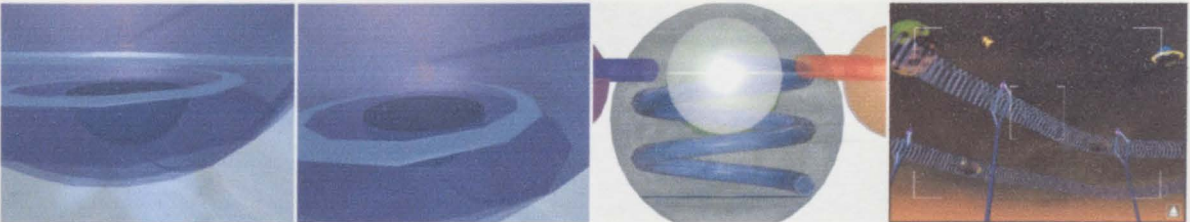
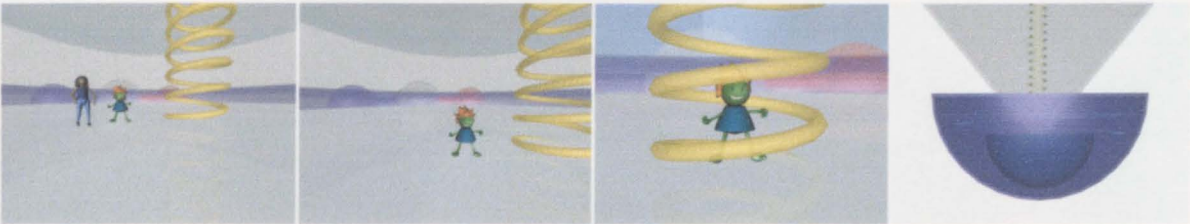
4
AWARENESS
OF INEVITABLE
LANDING..
VIEW OF CLOUDS
COVER OVER
PLANET../GAIA
(SEE NASA PICS)

GAIA – Design Development Sketch 07

Appendix 4.2

Visuals of Product Development Proposal 5



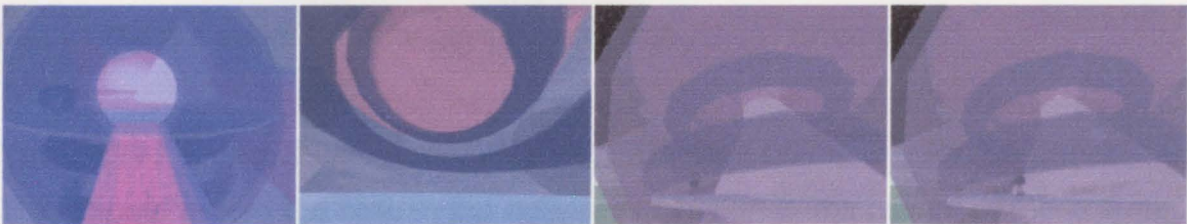


Appendix 5.1

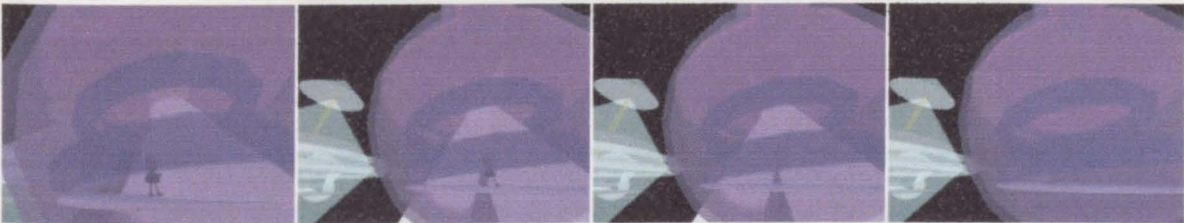


the age range 25-30 years.

Your supervisor may advise you in much the same way as an art director would.



Your final concept idea presentation should consist of both a brief written synopsis of the concept and some sketches or drawings or storyboards.



presentation sheets.



Appendix 5.1

Design Experiment

Group A - Briefing

The purpose of the experiment is to design a game concept aimed at users in the age range 25-50 years.

Your supervisor may advise you in much the same way as an art director would in a studio environment. Any advice given should be documented.

You should keep a detailed record of your activities during the design process. This should record the time of the activity in addition to the nature of the activity.

Your final concept idea presentation should consist of both a brief written synopsis of the concept on one A4 sheet in addition to drawn or diagrammatic information presented on one A3 sheet.

Please use the A4 paper provided (not sketch books). All sheets should be submitted at the end of the experiment in addition to the final concept presentation sheets.

Any references or influences on your groups design concept should be identified on a separate piece of A4 paper and submitted.

Each designer in the group should also fill out a feedback sheet at the end of the experiment to be handed to their supervisor before leaving.

Appendix 5.2

Design Experiment

Group B - Briefing

The purpose of the experiment is to design a game concept aimed at users in the age range 25-50 years.

You will be following an existing publisher driven design method (see attached sheet) practised within software development studios. This may be supplemented with product development and design process methods and the following books are provided for reference:

Jones (1980) Design Methods

Stoll (1999) Product Design Methods and Practices

Your supervisor may advise you further in much the same way as an art director would in a studio environment. Any advice given should be documented.

You should keep a detailed record of your activities during the design process. This should record the time of the activity in addition to the nature of the activity.

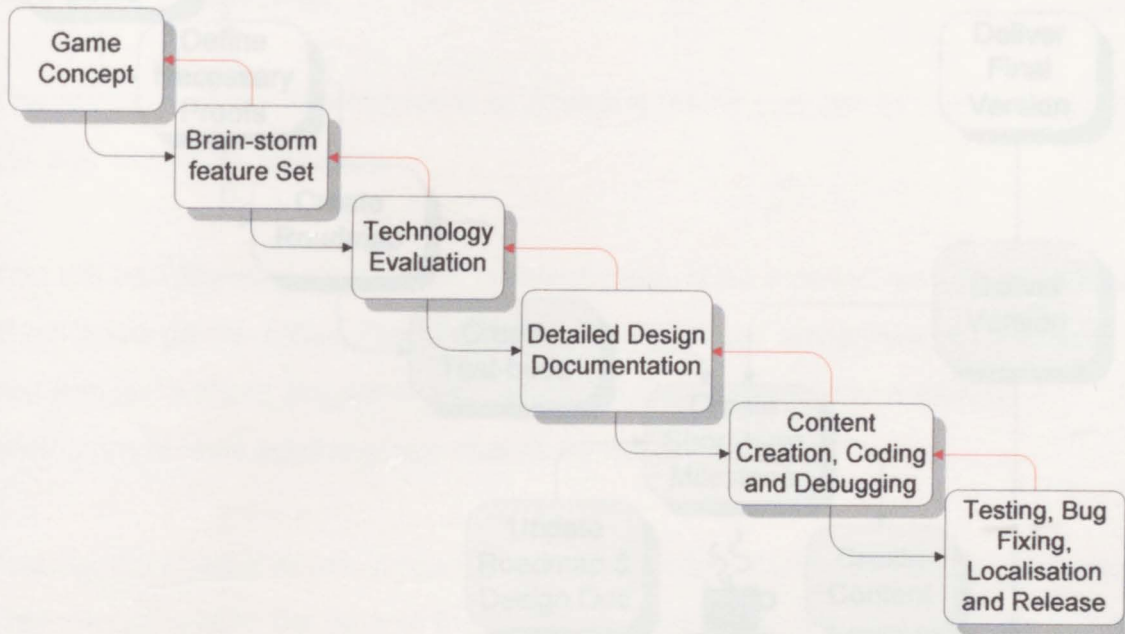
Your final concept idea presentation should consist of both a brief written synopsis of the concept on one A4 sheet in addition to drawn or diagrammatic information presented on one A3 sheet. Please use the A4 paper provided (not sketch books) ñ all sheets should be submitted at the end of the experiment in addition to the final concept presentation sheets.

Any references or influences on your groups design concept should be identified on a separate piece of A4 paper and submitted.

Each designer in the group should also fill out a feedback sheet at the end of the experiment to be handed to their supervisor before leaving.

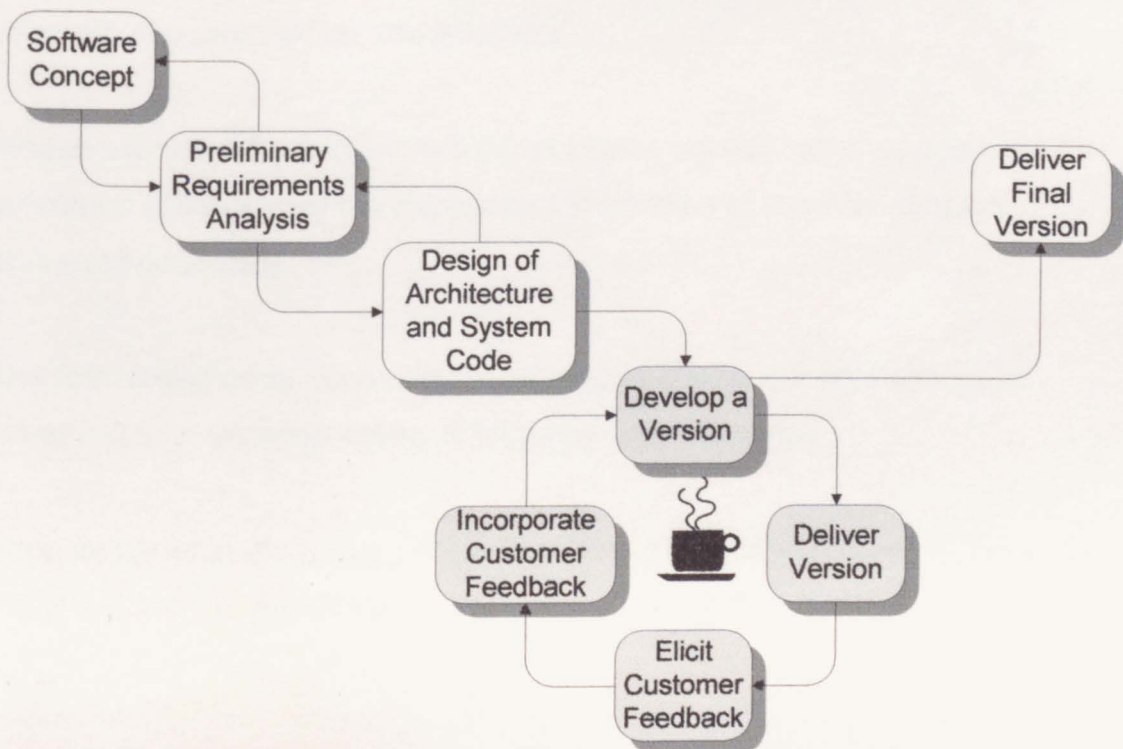
Software Game Design Processes:

Publisher Driven

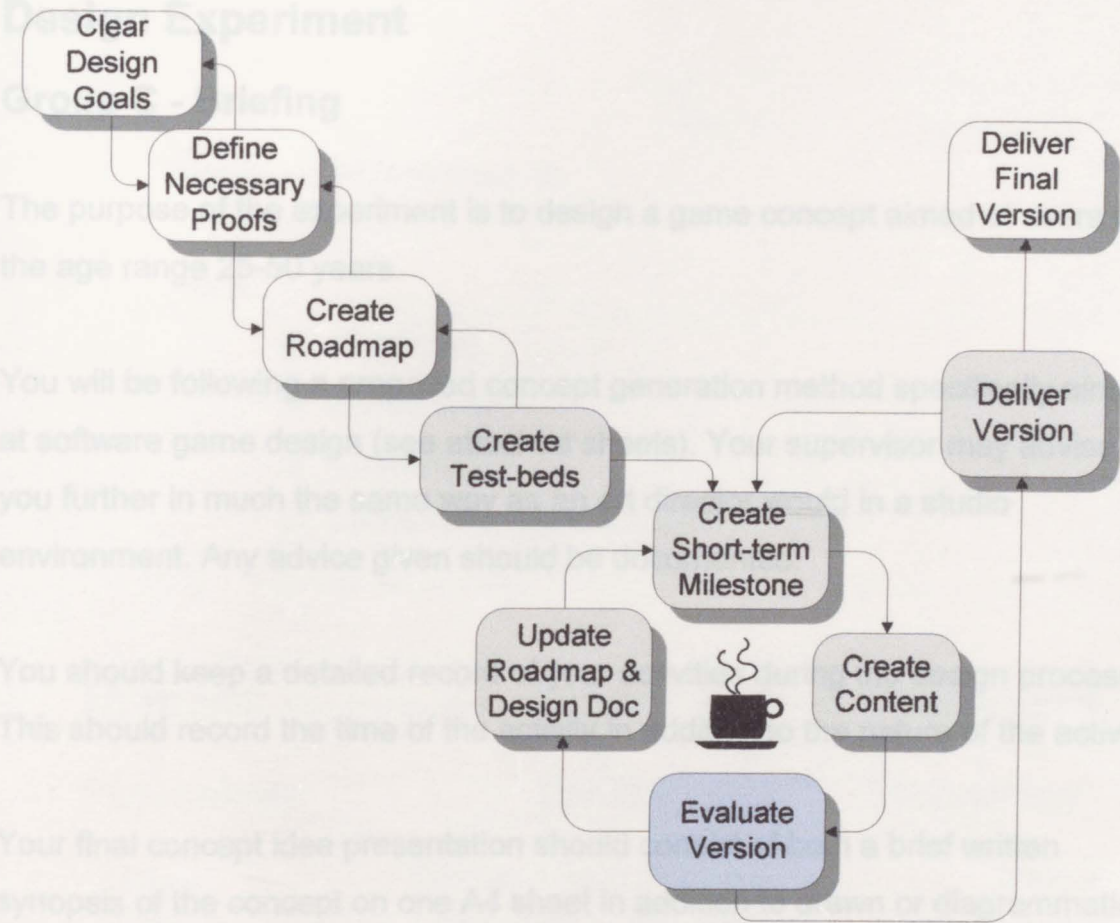


Based on diagram in: "Rapid Development" (Steve McConnell, Microsoft Press, 1996)

Staged Delivery Process



Organic Development Process



Appendix 5.3

Design Experiment

Group C - Briefing

The purpose of the experiment is to design a game concept aimed at users in the age range 25-50 years.

You will be following a proposed concept generation method specifically aimed at software game design (see attached sheets). Your supervisor may advise you further in much the same way as an art director would in a studio environment. Any advice given should be documented.

You should keep a detailed record of your activities during the design process. This should record the time of the activity in addition to the nature of the activity.

Your final concept idea presentation should consist of both a brief written synopsis of the concept on one A4 sheet in addition to drawn or diagrammatic information presented on one A3 sheet.

Please use the A4 paper provided (not sketch books) - all sheets should be submitted at the end of the experiment in addition to the final concept presentation sheets.

Any references or influences on your group's design concept should be identified on a separate piece of A4 paper and submitted.

Each designer in the group should also fill out a feedback sheet at the end of the experiment to be handed to their supervisor before leaving.

Diagnostic Concept Generation Technique

(Wilson, 2004)

1. Questionnaire (see page iii)
2. Tool Kit
 - a) Motivators
 - b) Environment
 - c) Character(s)
 - d) Current Product Evaluation Images

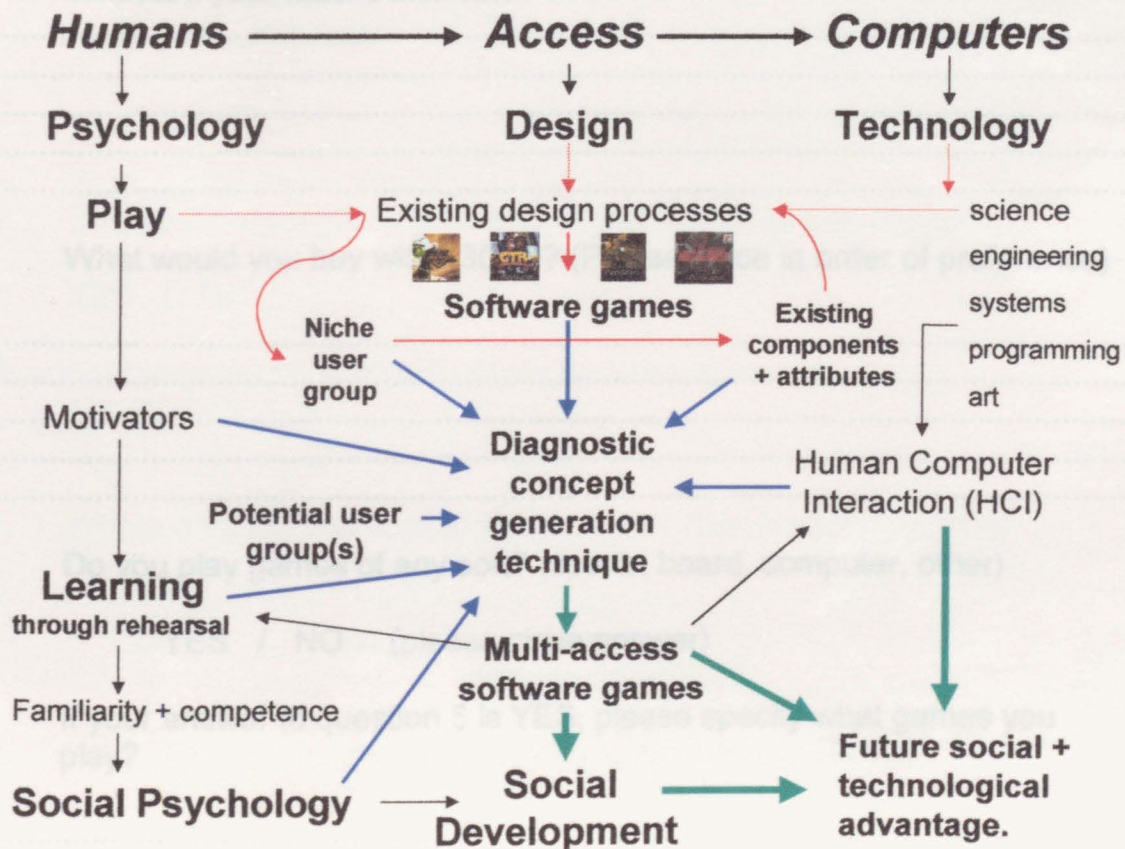


Diagram to illustrate context of diagnostic concept generation technique

DESIGN EXPERIMENT QUESTIONNAIRE

Thursday 1st May 2003

The purpose of this questionnaire is to carry out research into leisure interests. Any information provided by you will remain confidential and any analysis of data will preserve anonymity.

1a. What age are you:

1b. Female ☐ Male ☐ (Please tick)

2. What are your personal interests?

.....

.....

.....

.....

.....

3. What are your leisure interests?

.....

.....

.....

.....

.....

4. What would you buy with £30.00? (Please place in order of preference)

- a)
- b)
- c)
- d)
- e)

5. Do you play games of any sort? (sports, board, computer, other)

YES / NO (please circle answer)

6. If your answer to question 5 is YES, please specify what games you play?

.....

.....

.....

.....

.....

7. How often do you play the above games?
(please tick one option)

Every day?
Once or twice per week?
Once or twice per month?
Less often?

8. Do you prefer to play:

_ Solitary games? _ Double or partnered games? _ Group games?

Why do you prefer to play this way ?

9. Please describe what feelings motivate you when playing a game?

10. Do you have access to a personal computer or games console?

YES / NO

(please circle answer and specify what you have access to)

11. Where do you have access to the above? (please tick response)

_ Home? _ Work? _ Elsewhere
(please specify).....

12. How often do you use the above? (please tick one option)

_ Every day?
_ Once or twice per week?
_ Once or twice per month?
_ Less often?
_ Never?

12a) What do you use the above for? (Please circle all those that apply)

Word Processing Graphics Internet E-mail Games Music

Other.....
(Please specify)

13. What is your career or occupation?

.....
.....

14. What style(s) of music do you enjoy?

.....
.....
.....

15. What magazine(s) or newspapers do you read?

.....
.....
.....

16. Please name your favourite shop(s)?

.....
.....

17. Can you name a well known person who has influenced your life and briefly state why?

.....
.....
.....

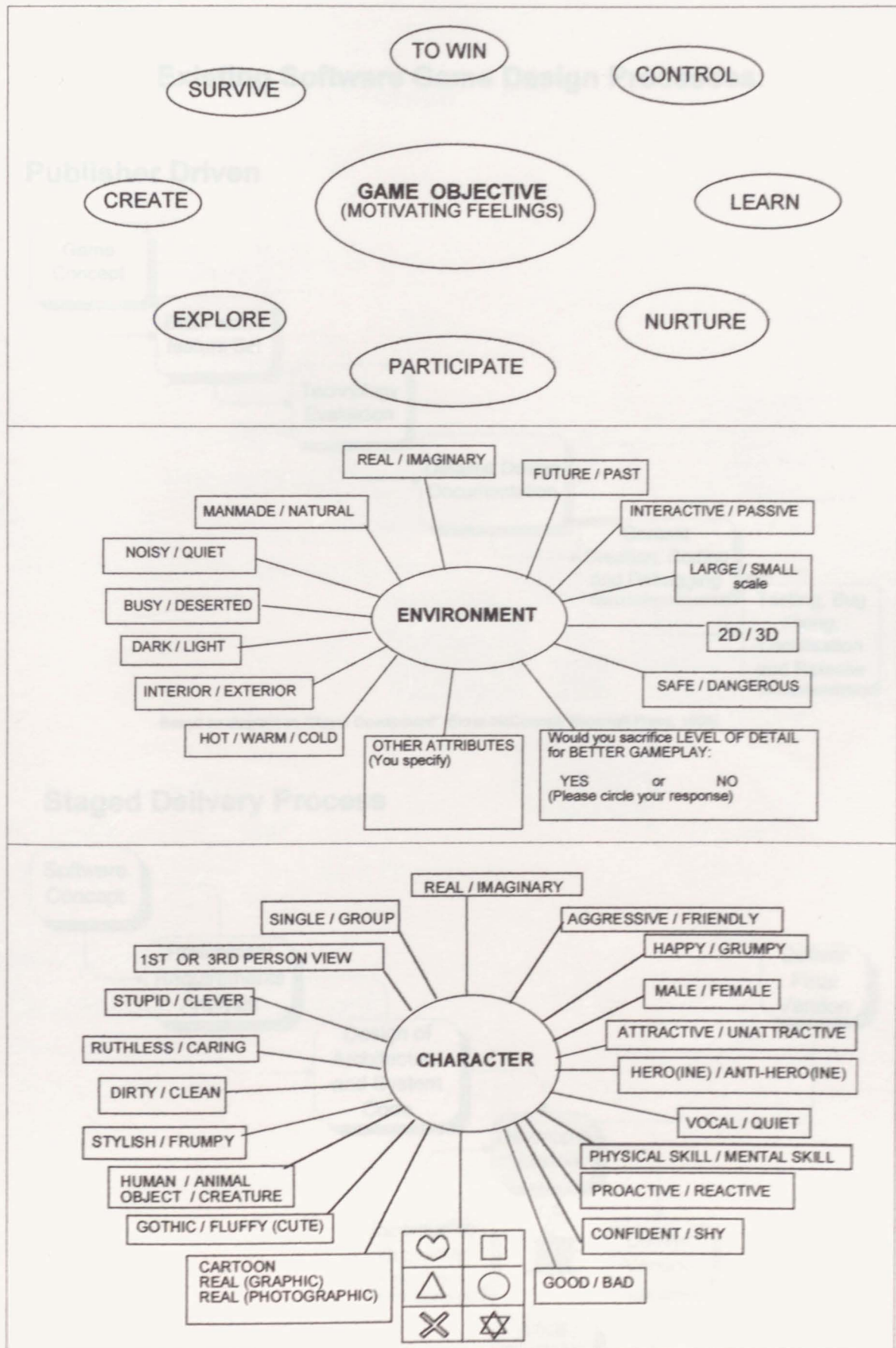
18. What is your favourite television programme and/or film?

.....
.....

YOUR NAME:

(This information will only be used to contact you and not for any other purpose)

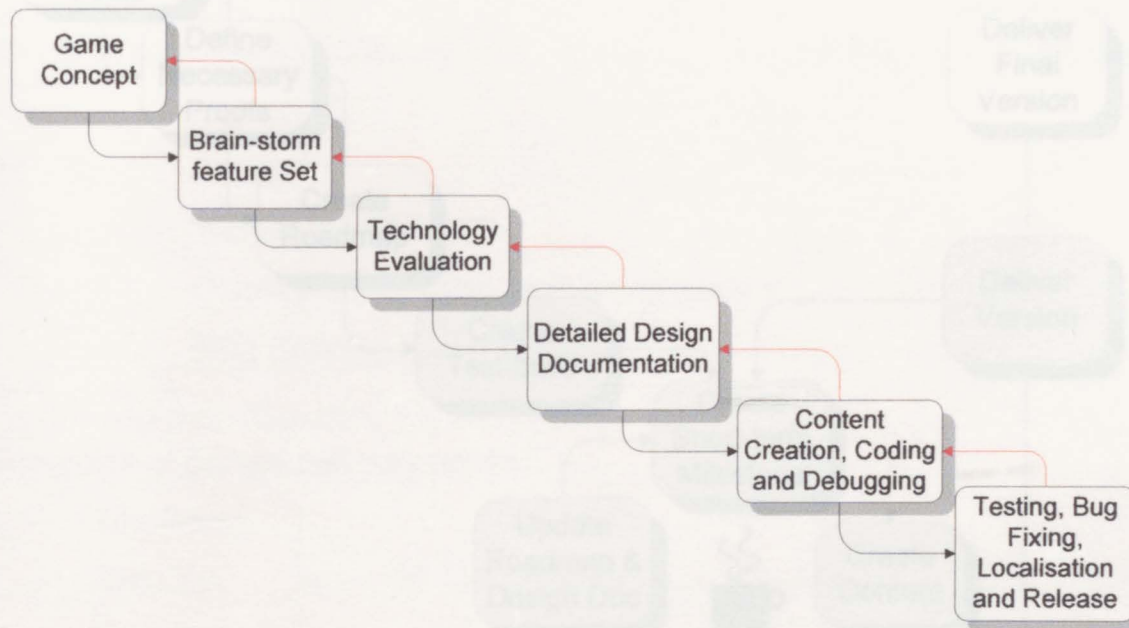
THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.



Tool Kit Sheets supplied to Group C for Concept Generation Technique

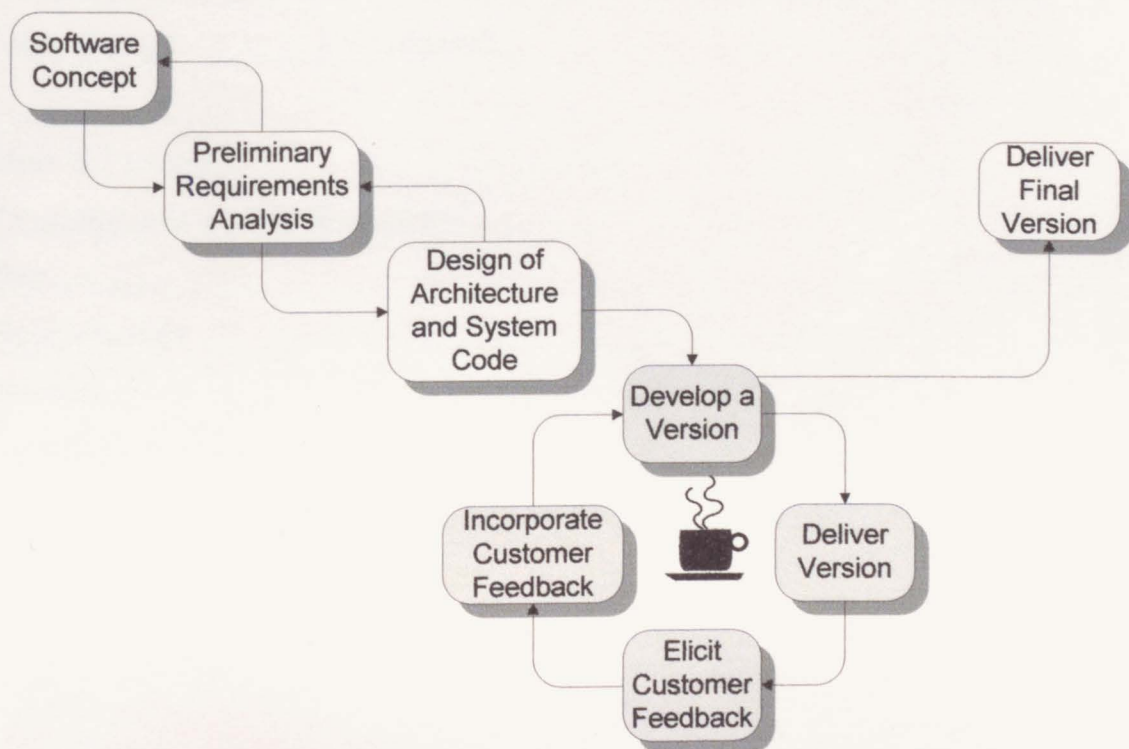
Existing Software Game Design Processes:

Publisher Driven

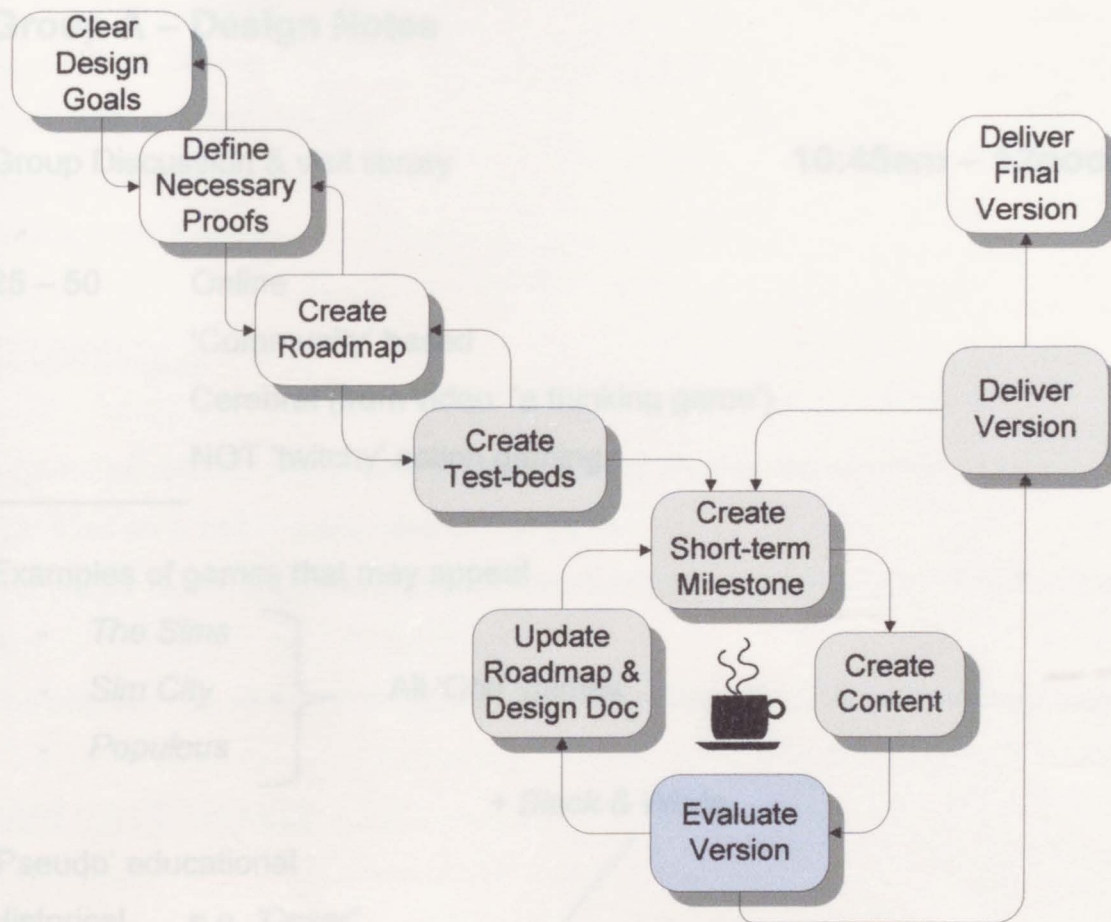


Based on diagram in: "Rapid Development" (Steve McConnell, Microsoft Press, 1996)

Staged Delivery Process



Organic Development Process



Appendix 5.4.1

Group A – Design Notes

Group Discussion & visit library

10:45am – 12noon

25 – 50 Online

'Community' based

Cerebral (from video: 'a thinking game')

NOT 'twitchy' action gaming

Examples of games that may appeal

- *The Sims*

- *Sim City*

- *Populous*

All 'God' games

+ *Black & White*

'Pseudo' educational

Historical e.g. 'Cesar'

Story Based

Morality

Male & Female

What appeals to men & women?

Sex

Relationships

Morality

Fashion

Current Affairs

'Popular Culture'

Popular Culture

T.V.

- Soap Operas
- Quiz Shows
- Big Brother (Reality)
- Documentaries
- 'Talent Shows'

CELEBRITY !!!

A game where the player takes on the role of an aspiring celebrity.

You start as a nobody who dreams of fame

The player has complete reign over the character and what their ambition may be.

The players rise to success will be dictated by the career decisions they make.

CAREER DECISIONS...

- Image
- Talent & Ability
- Relationship with media
- Sex

Character maximum 20 points

Each characteristic

Looks out of 10

Talent

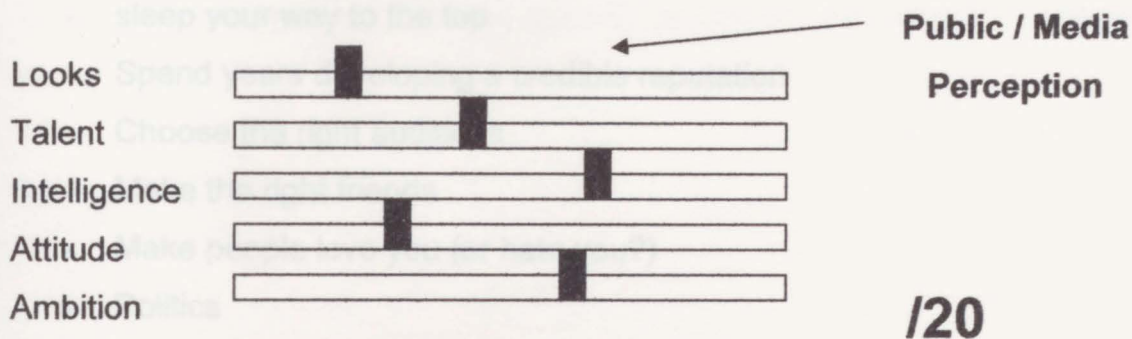
Intelligence (Business sense)

Attitude

Ambition

You start with 20 character points / credits

Your initial choice is to determine your characters 'natural' abilities / attributes.



Sliding scales – each goes up to ten

Therefore you have to choose to be

e.g. Beautiful & Dumb

Talented & Ugly

Or balanced in all areas.

Confidence

As you progress you characters' exp. (20) will grow or diminish (like your confidence) according to how successful and popular you are.

e.g. will choose:

As you make money (which come with success) you will be given the opportunity to 'enhance' elements of your character thus increasing your confidence score.

i.e. If you make enough money, you could have plastic surgery, therapy, employ a stylist, employ a marketing team etc.

You cannot restart unless you die or commit suicide or are killed (this would make you care more about your character and the choices you make).

However, as a celebrity, death can be both a positive and negative thing.

i.e. If you're hugh and it suits your image, suicide could boost your image to the stuff of legend... a martyr (e.g. Kurt Cobain).

Or you could die a nobody.

EXAMPLES OF CHOICES

Celebrity – Modern Day Stars

- sleep your way to the top
- Spend years developing a credible reputation
- Choose the right auditions
- Make the right friends
- Make people love you (or hate you?)
- Politics

Sport

EXAMPLES OF GAME STYLES

Music

Auditions – Rhythm action games (Parappa the Rapper etc)

10' Cat / Boy

THIRD PERSON PERSPECTIVE

Science

Idea to make money and be popular no matter what it takes.

The game is online. You play as an aspiring celebrity. Your audience is online.

You will choose:

- a male or female
- their age
- sexual preference
- image and style

You will also choose the profession they aspire to although your ambitions can change.

Sex, Drugs and Rock & Roll

Are you going to be Michael Barrimore or cliff Richard.

Do you live and preach a rock & roll lifestyle or live a 'quiet' celebrity lifestyle?

Will you be a 'Madonna' who constantly updates her / his image to maintain the momentum of their fame? Or will your talents and abilities make you a timeless icon? Like Bob Marley / Billie Holiday etc.

Celebrity = Modern Day Gods

They are worshipped and revered but only as long as they keep their followers happy.

Media – Paparazzi & Reporters etc.

Categories of Celebrity

General Public to manipulate.

- Politics
- Sport
- Acting
- Music
- Fashion
- 'It' Girl / Boy
- 'Culture' — Literature etc
- Science

The game is online. You play as an aspiring celebrity. Your audience is made up of computer NPC's and the online community of aspiring celebrities.

You can interact with online players, i.e. chatting, dating etc.

You could team up with online players to form 'boy-bands', celebrity marriages / partnerships etc.

12 – 4:00pm

NPC's

Your fanbase

Media – Paparazzi & Reporters etc.

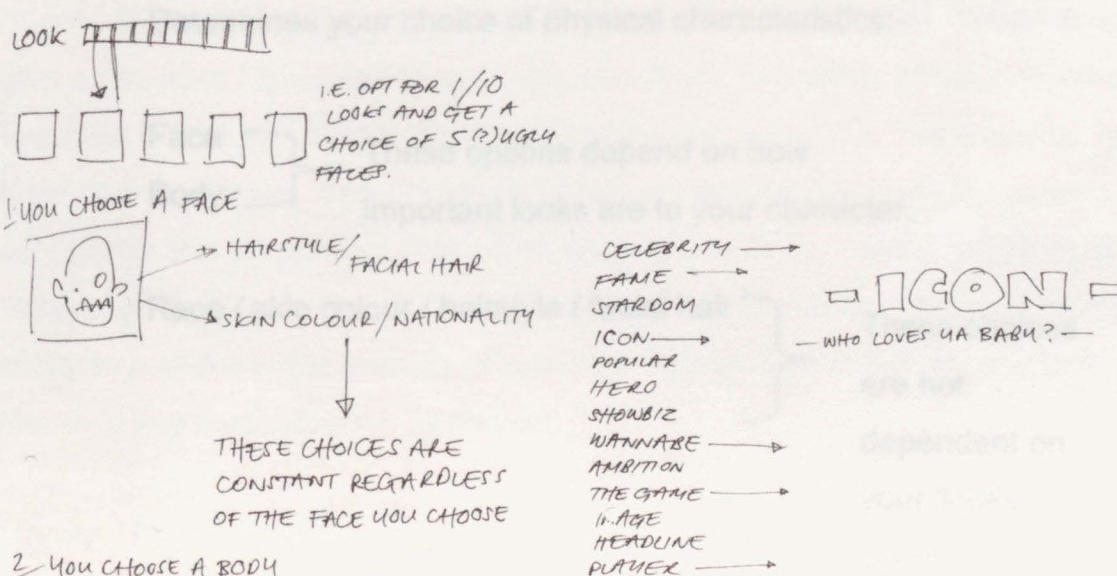
Police and Security

1. General Public to manipulate.

Male or female.... However if you anger or alienate your fans, their attention can then turn negative so you become unpopular, lose money or in worst case scenario you may acquire a stalker...

.....in this instance you must employ security or leave yourself open to physical attacks etc.

As your celebrity grows, your options change... you may be able to go on luxurious holidays and have the best of everything but by the same token, you can no longer walk down your local high street, and the media are always trying to catch you off guard...what do you do? How do you balance your private life with public exposure? How do you maintain public interest without making them sick of the sight of you? (i.e. Posh & Becks).



All characters start from the same - **ICON** - virtual space that houses everyone in the online community (at the start). This takes the form of an apartment building where you **TITLE SCREEN**. You have your own flat in the building where you have a wardrobe, bed, computer, bathroom. Each day a paper is delivered to you (**OPTIONS**) outlining the days

op. 1. activities / events. Each day you will choose an outfit from your wardrobe, a choice - sex initially limited will grow in size and style depending on your success. - age - nationality and make money, you will have the option to move up in the virtual world. The city will be split into distinct areas, each one containing

2. characteristics / attributes
looks / beauty
talent → music
acting
sport

intelligence

ambition

3. Your decision on your 'looks' meter
Determines your choice of physical characteristics:-

Face } These options depend on how
Body } important looks are to your character.

Race / skin colour / hairstyle / facial hair } These choices are not dependent on your 'looks' count.

for all employed players. The job is unspecified... only the money is important

All characters start from the same 'building' – a virtual space that houses everyone in the online community (at the start). This takes the form of an apartment building where you start and finish your day. You have your own flat in the building where you have a wardrobe, bed, computer, bathroom. Each day a paper is delivered to you (like 'Variety' magazine) outlining the day's opportunities / events. Each day you will choose an outfit from your wardrobe, a choice that while initially limited will grow in size and style depending on your success. Your apartment block is in a bad part of town, but you are not stuck there. As you progress and make money, you will have the option to move up in the virtual world. The city will be split into distinct areas, each one containing a building accommodating aspiring stars. Each area represents a status symbol which reflects your successes or failures in the game. To reach the elite 'Beverly Hills' type area, you not only have to be rich, you have to be popular, to be 'in' with the 'in' crowd, the idea being that achieving such status is hard.

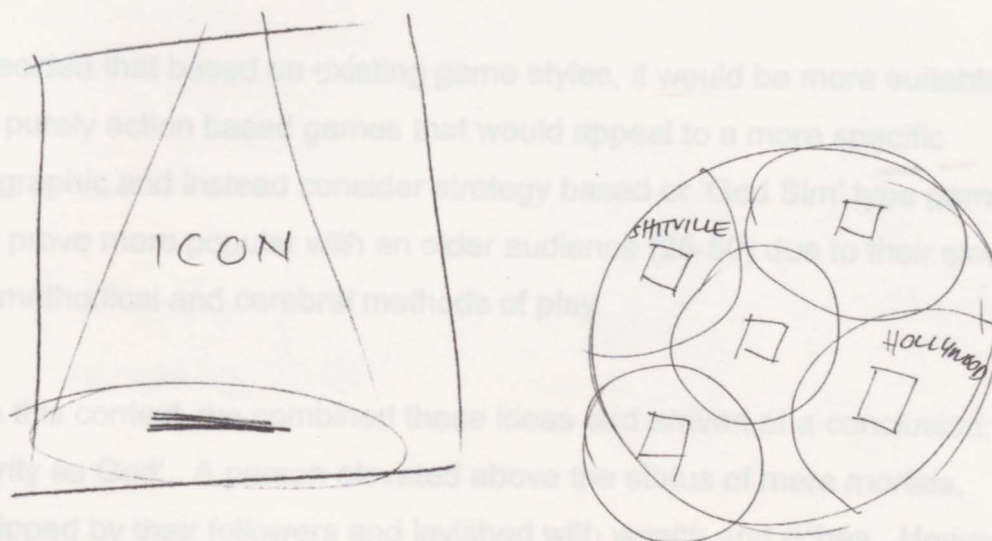
On starting your day, you would check your computer for messages / feedback and check the paper for any possibilities / opportunities for that day. You may have appointments with other players / NPC's and it's your choice to keep them or not. Similarly, you may see an audition you like the sound of. These things give a structure / timetable to your day, which you can either follow or ignore. The idea is that you choose the way you play the game, it is free roaming, be a loser or a superstar. If you're happy to wander around a virtual city, playing mini game and 'observing', that's fine, but you'll more than likely remain in the 'crappy' part of town, and you'll eventually run out of money, which will limit your ability to partake in the majority of activities / minigames in the city, making money a key motivation for all players.

Money There's only one way to get money in this game... earn it!! You can choose to be wither unemployed (on the dole) with a small weekly allowance, or you can choose to be employed for a decent wage (initially) – the same amount

for all employed players. The job is unspecified... only the money is important. However, by taking the employment route, you limit the time you have to exploit opportunities and vice versa for the employed character.

Why be famous?

- women / men
- money
- limo's
- expensive homes / clothes / jewellery



Appendix 5.4.2

Group A – Design Concept

Project: ICON

After considering the brief and the target demographic and drawing on topical aspects of popular culture, we came to the conclusion that one of the few things that draws massive attention from both the male and female public is the culture of celebrity.

We decided that based on existing game styles, it would be more suitable to avoid purely action based games that would appeal to a more specific demographic and instead consider strategy based or 'God Sim' type games which prove more popular with an older audience (25-50) due to their slower, more methodical and cerebral methods of play.

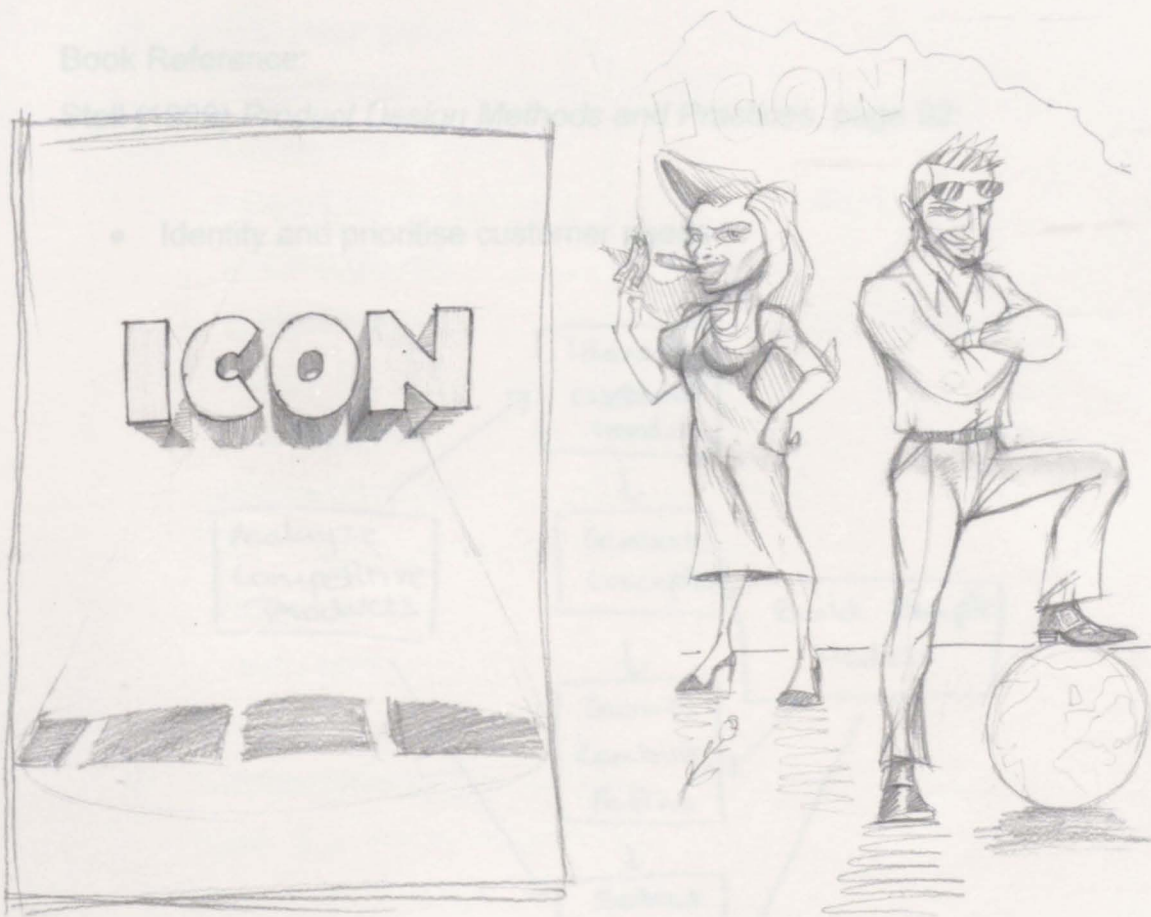
Within this context, we combined these ideas and arrived at a conclusion; 'The Celebrity as God'. A person elevated above the status of mere mortals, worshipped by their followers and lavished with wealth and riches. However, there is a twist. Celebrities aren't 'born', they're made, and the 'privilege' of celebrity can be attained by anybody who wants it badly enough.....

ICON puts you in the shoes of a wannabe star who is trying to make their name in the cut-throat entertainment industry. The ultimate goal is to reach 'icon' status, an individual so famous, their name becomes legendary. It's not an easy thing to achieve...

Will you go to the right places, make the right friends, or simply be in the right place at the right time? Not only do you have to manage your own life, you also have to control your fans, gagging for more... will you be a flash in the pan or a legend in your own lifetime?

The game takes place in a city divided up into areas of status (i.e. rich to poor) and like any aspiring star, you'll have to work your way up the ladder. However, this is a free roaming environment where luck can play just as major a role as hard work, your destiny could change around the next corner...

The game would be online, giving the player the opportunity to communicate and even collaborate with other players... form a boyband or get married, you could even sleep your way to the top... the idea is to create an online 'Pirahna Tank' of wannabe stars.



Sketches of concept idea presented by Group A

Appendix 5.5.1

Group B – Design Notes

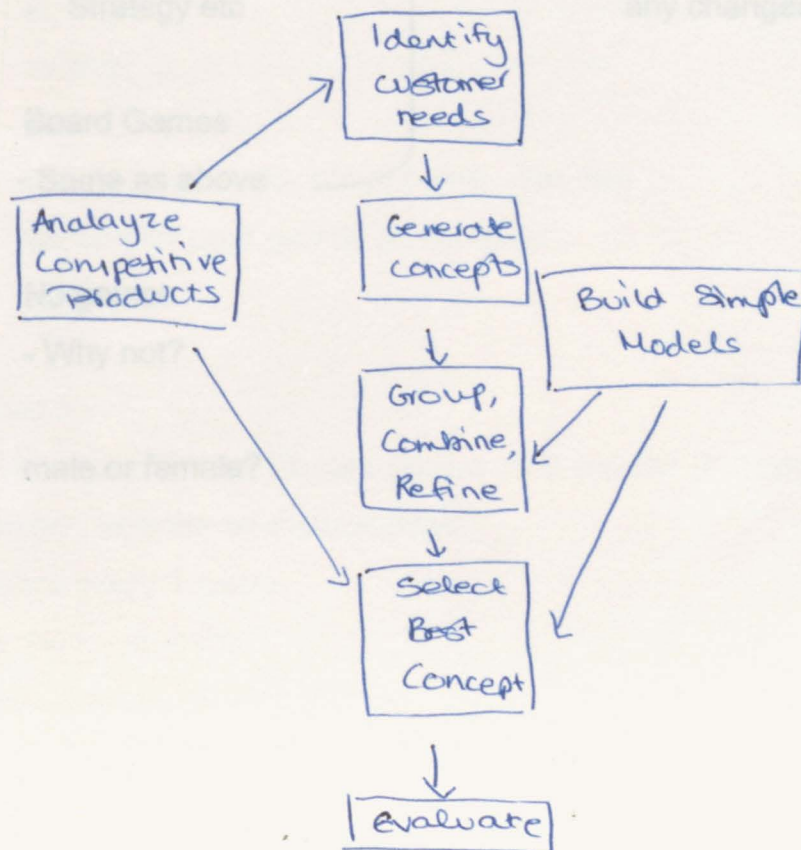
11:45 Brainstorming

- Minesweeper 3D
- Quiz Game
- Card Games

Book Reference:

Stoll (1999) *Product Design Methods and Practices*, page 92:

- Identify and prioritise customer needs



1. What is the problem?
2. Who is the user?
3. What does the user need?

Questions asked of library staff:

1. Do you play games?
Board games or computer / video games
2. How often?

3. Computer games

- Which ones?

- What kind?

- Role Play

- Card Games

- Strategy etc

Board Games

- Same as above

why?

any changes?

4. No games

- Why not?

4. male or female?

12:15pm Group B Survey of library staff.**1. Yes – board games**

Respondent 1:

1. Yes, computer, card games
2. 1 – 2 times per week, sometimes everyday
computer games – Dune 2000, Mahjong. Strategy + interesting
why not other? – hard to follow, create characters
3. music and graphics not very good.
4. female

Respondent 2:

1. Yes, cards, board games with kids
2. 1-2 times per week
board – cards, monopoly
fun competitive
strategic
variety
fast
3. computer games – not at home. Too fast
would play card games on computer.
4. female

Respondent 3:

1. Yes, cards (bridge) + card games on computer (but prefer by hand), solitaire on the computer
2. once every 3 weeks
bridge – strategy
monopoly – thinking games
- 3.
4. male

Respondent 4:

1. Yes – board games
2. once per month
3. computer games – no, because work on computers a lot (RSI)
board games – scrabble, monopoly (occasionally), chinese
game, labyrinth, lyo, cards.
Changes? – types don't like – monopoly on computer.
Prefer abstract, straightforward, simple strategy.
4. female.

Respondent 5:

1. Yes – computer games
2. weekends
3. computer games – POGO (web), puzzles, jigsaws.
└─ Word, balloons.
 - point scoring. Chat at same time (not compete with other people) use points to raffle for prizes.
 - British version
 - Arcade games!
4. female.

12:45pm Group B: Analysis of data

Puzzles

Jigsaw

Word Games (*Scrabble*)

Popping Balloons

Arcade

*Monopoly**Mahjong**Labyrinth**Iyo*

Cards

Strategy Games

(*Dune 2000*)

→ clear goal

→ strategy

→ 'fast games'

→ multiplayer

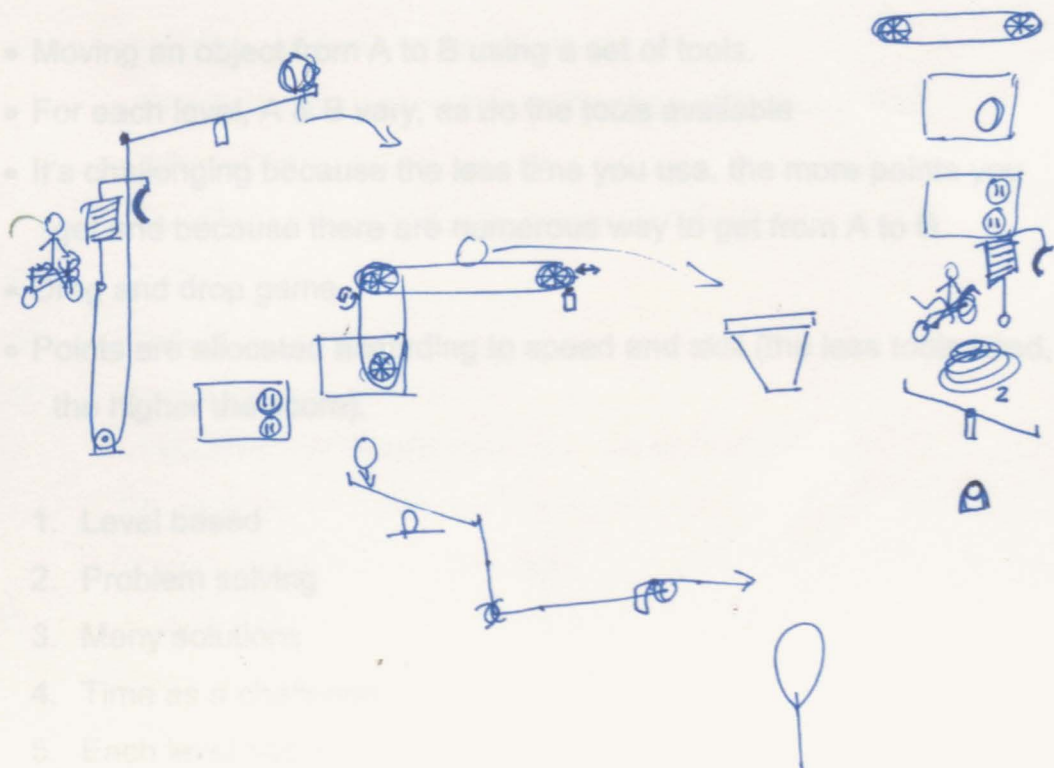
→ competition

→ simple

Can do other things while playing without losing track of the game

Like computer games

People don't have much spare time.



Group B's illustration of 'Contraptions' PC game.

1:00pm STRATEGY GAMES

- beat the opponent / computer
- outsmart them
- game plan
- a test
- hidden element
- solving a problem
- detective story

1:30pm

1. Game with levels
 2. Points for completing level – bonus points for finishing in set time limit.
 3. One player game – compare scores with other players
 4. 2D
 - Moving an object from A to B using a set of tools.
 - For each level, A & B vary, as do the tools available
 - It's challenging because the less time you use, the more points you get and because there are numerous way to get from A to B.
 - Drag and drop game
 - Points are allocated according to speed and skill (the less tools used, the higher the score).
1. Level based
 2. Problem solving
 3. Many solutions
 4. Time as a challenge
 5. Each level has a different goal
 6. Instructions clear
 7. Easy manipulation
 8. Teaches you tools on tutorial levels.

Group B - Influences and References

Books:

Stoll (1999) *Product Design Methods and Practices*

Games:

Contraptions

Tetris

Worms

Cliffhanger

Minesweeper

Donkey Kong

Group B – Supervisor's notes:

11:50am Students randomly brainstorming

- Direction – they know they will speak with library staff.
- What will they say
- Directed back to process sheets and books.

12:05 Go to library

12.30 Back from library

12.50 Spoke through results

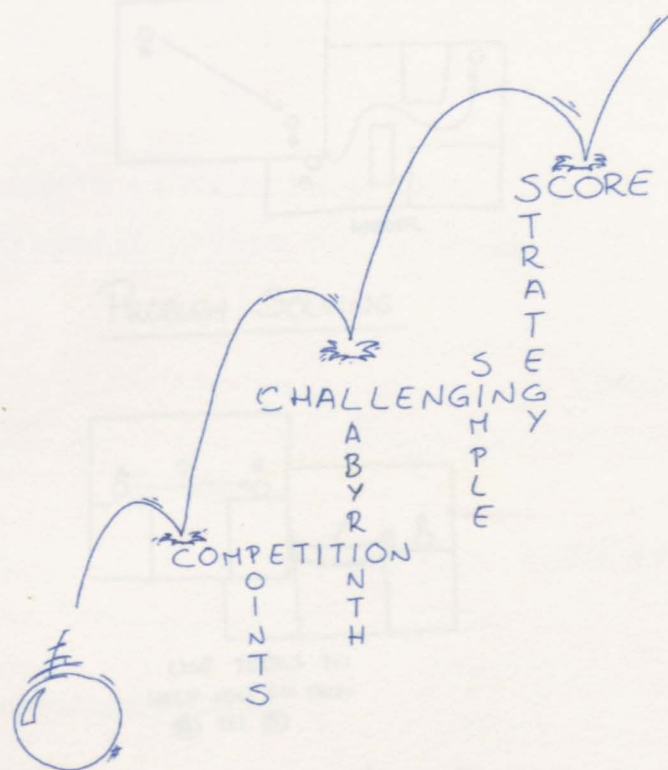
- Direction – to break down discoveries further
i.e. clear goals – what they could be
points – how, points / time, why.

2.30 Talked through further breakdown

Students unsure what to do next. Advised to look into existing games and why they work well & where & how they fit parameters set for themselves.

Appendix 5.5.2

Group B – Design Concept



Moving an object from A to B using a set of tools.

- for each level, A and B vary, as do the tools available.
- It's challenging because the less time you use, the more points you get, and because there are numerous ways to get from A to B.
- Drag and drop game
- Points are allocated according to speed and skill (the less tools you use, the higher the score).

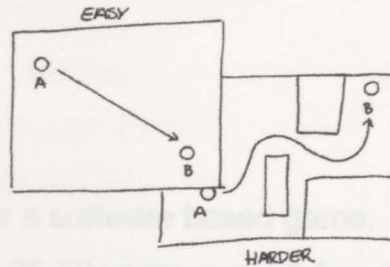
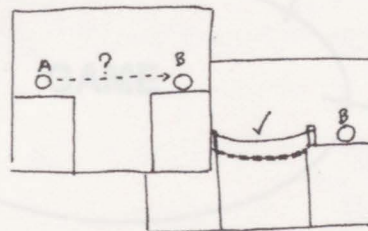
Appendix 5.5.1

LEVEL BASED

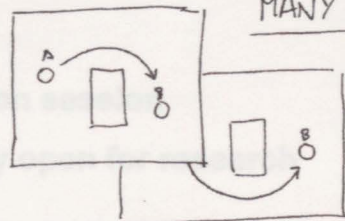
Group C – Design Notes

BRIEF

Produce a concept for a software game
Audience being aged 25-50 years, male & female.

PROBLEM SOLVING

USE TOOLS TO
HELP YOU GO FROM
A TO B

MANY SOLUTIONSTIME BASED**Sketches of concept idea presented by Group B**

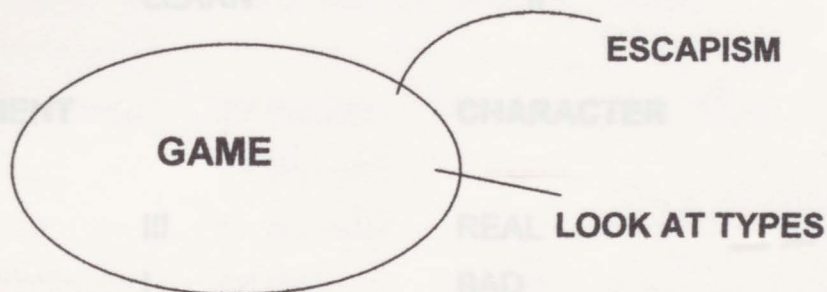
Appendix 5.6.1

Group C – Design Notes

BRIEF

Produce a concept for a software based game.

Audience being aged 25-50 years, male & female.



Test group predominantly female.

- 12.45 Briefing
- 12.50 Discussion session
- 13.05 → Library open for research

We discussed the task in hand and upon considering our audience 25-50 realised that our task was vast. We would need to cater for all types

- We may need to section our audience into categories

Older you get the less chance you have of people playing technology based games.

Tool Kit Results

GAME OBJECTIVES

TO WIN	II
SURVIVE	II
PARTICIPATE	III
CREATE	
EXPLORE	
LEARN	II

ENVIRONMENT

CHARACTER

NATURAL	III	REAL	I
REAL	I	BAD	
FUTURE	I	CONFIDENT	I
DARK	I	DIRTY	
LARGE		MENTAL SKILL	I
BUSY	I	HUMAN	
QUIET	II	1 st PERSON	
DANGEROUS		GOTHIC	
WARM	II	FLUFFY / CUTE	
3D	II	ATTRACTIVE	I
EXTERIOR	I	ANTI-HEROINE	I
IMAGINARY		FRIENDLY	
DESERTED		HAPPY	
PASSIVE		FEMALE	
SMALL	I	VOCAL	
2D		GOOD	
SAFE	I	3 rd PERSON	
INTERACTIVE			
PAST			

In addition to the tool kit results presented by the group, they also collected five completed questionnaires from the target user group.

2.15pm

At this point of the project we have discussed our task and the objectives – the problems we face.

Audience 25-50 (the research was controlled and people to study is by no means as vast as the target market)

Studied / Questionned: 27 (female)

37 (female)

47 (female)

50 (female)

31 (male)

Conclusion:

We need to tighten our brief

with regards to our audience.

Before you can develop an idea for a game (with a view to selling it commercially) you must first understand the audience it is aimed at.

Problems we have found so far is that we realise firstly that the brief given (25-50 years) is too open and the audience too diverse.

A game is a product – therefore it should be treated as such. If a product is purely functional most people will use it, but the fact is that not all will enjoy the experience (enjoyment is based upon personal opinion, personal goals, objectives, likes / dislikes etc).

We must break down our audience into areas of experience and personal taste – age is not always the best way of categorising people / target audiences.

We have been given a specific set of people to base our ideas on – their ages vary yet they do have similar likes and dislikes.

We surveyed five members of the library staff (a small number – specified by Jacob Neilson for usability testing and research feedback).

We discovered that as we suspected, they did all have similar experiences, likes, dislikes etc. We can develop a game for them under the principles given to us by Wilson (2004).

Our user profile:

From the questionnaires supplied we concluded the following:

- From the way information is presented and the way questions are asked, people perceive the answers and meanings differently.

All of the people questioned are somewhat educated and have similar likes, dislikes and tastes.

In such a short time it is hard to do a lot of research, but after talking about the task and looking at our results we conclude that...

- A game must relate to its audience in order to be played.
- Relationships are based on trust and understanding – the audience must relate to the game in as many ways as possible to create a greater experience (relating does not mean actually being them in a digital form, but being representative of their needs and aspirations) e.g. If a nine year old child wants to be James Bond 007!

When creating a game, understanding is a big issue. Understanding is very similar to the principle of relating – games built for a wide audience should be built using principles all of that audience understand.

- *Tetris* for example, is built upon the understanding of tessellation (objects fitting together) – a principle we, as humans, learn at a very young age – thus creating.

→ We would suggest that if you were designing a game for the world's population, it is impossible to create a character that everyone can relate to but if the idea was built around the principle of gravity, i.e. if you let a stone go from a height of 1 meter, it will fall 1 meter to the ground. Everyone understands – Everyone relates.

The problem at this stage arises with the technology – not everyone would know how to use a mouse or computer.

Our next argument:

Games are limited by the technology used. Not only in the limits the technology has physically, but the limits a user has in using the technology.



The age group of 25-50 is affected by this. Many people 40-50 years do not use or understand a computer well, this translates onto consoles and technology in general.

IDEAS / PRINCIPLES

We have, after scrutinising the questionnaire results, identified key areas that we feel a game should adhere to when aimed at our target audience.

1. Non-character based (the players themselves are the characters)
2. Runs with the operating system with omnipresent quick-save option, to be able to dip in and out of the game when the user wants to.
3. Built around the things you understand and turning it into something the user can apply to that understanding.
4. Instill a sense of self-worth in the user, e.g. the 'Who wants to be a millionaire' computer game, where although the player is not winning real money, they still achieve a sense of self-worth through knowing that their knowledge or good guess work is worth 'x' amount.
5. Screen saver based, interactive.
For example, a beach scene where you can indulge in such delightful activities as sandcastle building, skimming stones, kite flying, crab husbandry, hide-and-seek. Relaxing, simple pastimes that relate to the scene on the screen saver, serving as a distraction from the other elements of your computer.
6. Find the point at which those who don't normally play computer games begin to identify with the principles (rules) and actions of computer games.

CONCLUSION

Group C – Design Concept

- Our idea questions what a game is and how people perceive the meaning of a game or play itself.
- Help to educate people – (the general population) on language used in modern computer games – visual, interactive, sound etc...
- Only through education of these individuals will other console game markets arise.

Group C – Supervisor's notes

2.10pm When questioned directly by the student designers, they were informed that the target group was the library staff. They seemed very concerned that such a small group could not possibly represent the whole target audience of 25-50 year olds. They were encouraged to consider this small group's views as being at least closer to the target group's views than if no consultation took place at all, since they were at least a representation from that larger group. This seemed to appease their concerns and they felt a lot happier to continue with the concepts they were generating.

Appendix 5.6.2

Group C – Design Concept

The idea for our game is based on the principles we have discussed. The final concept draws on the influences of the library staff, but can be applied to the target audience in the original brief, 25-50 year olds.

Based upon the principles of understanding, our idea is for a variety of platforms, but aimed mainly at a PC user market – everyone we spoke to had access to one and they said they only played games to pass the time – for brief intervals.

Built upon the influences of art, culture, music, education and knowledge, we plan to produce a series of interactive screensavers. These can be viewed as a normal screen-saver or be interacted with like the 'Cats & Dogs' software already available.

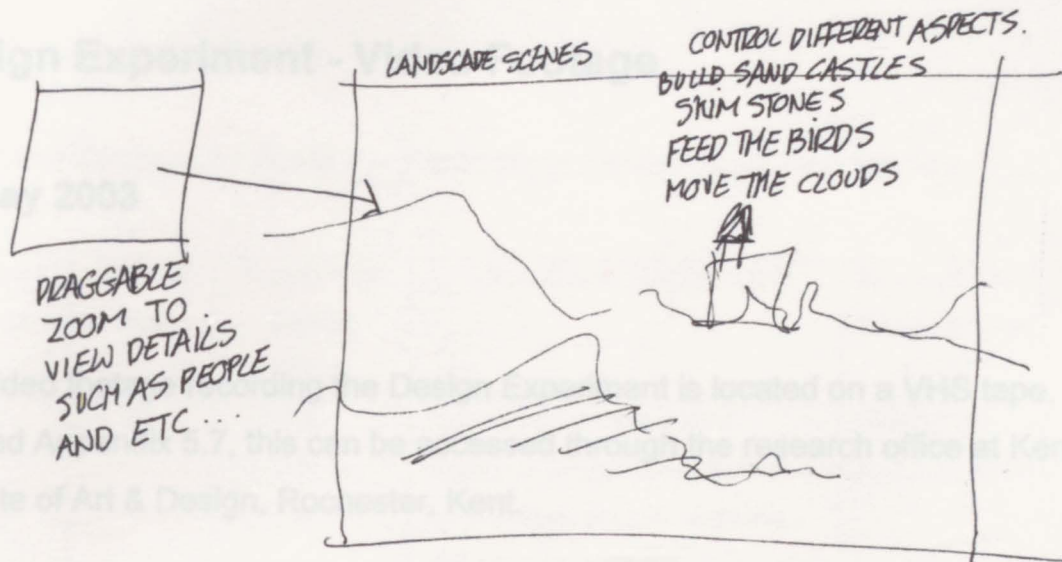
Music	Play music and screen displays visuals that can be adjusted, pulled around, colourised etc. – like an interactive 'itunes'
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Education

& Knowledge	Question and answer based – make choices, progress to next stage (save & return to at any time) – various knowledge banks available. → Library network, compete against each other.
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Art & Culture	As illustrated below, chosen images, art, culture, paintings are interactive – a learning experience with mini games built into the images.
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GAME DESIGN CONCEPT



sandcastle building

skimming stones

kite flying

crab husbandary

hide and seek

feed the birds

move the clouds

art, culture, painting images are interactive – a learning experience

Flower growing / Gardening

Desktop icons that represent plants or species that the user can nurture, while learning about the item and its needs.

Desktop 3D LEGO

Music

A kind of interactive *itunes*

Appendix 5.7

Design Experiment - Video Footage

Designer Feedback: Table 1 – Participant background information

1st May 2003

Student Number	Student Age	Experiment Design	Experience / Background	Areas of future design interest
1	20	A	5 years experience in drawing and creative projects Yr 1 BA Digital 3D Design	3D animation and Videogame Design
2	20	A	NDD Graphic Design Yr 1 BA Digital 3D Design	3D animation and Videogame Design
3	20	B	NDD 3D Design Yr 1 BA Interior Design Yr 1 BA Digital 3D Design	Don't know yet
4	20	B	5 years Technical Drawing 2 years Art / High School Some Web Page Design Yr 1 BA Digital 3D Design	Computer animation and special effects
5	24	C	5 years Commercial Design Experience – Graphics & Marketing Yr 1 BA Digital 3D Design	Creativity
6	28	C	Yr 1 BA Digital 3D Design	3D Design Futurism

Appendix 5.8

Designer Feedback

Designer Feedback: Table 1 – Participant background information

Student Number	Student Age	Experiment Design Group	Experience / Background	Areas of future design interest
1	26	A	Always had an interest in character design & animation. I have always enjoyed drawing and creative pursuits Yr 1 BA Digital 3D Design	Videogame design and 3D animation
2	20	A	NDD Graphic Design Yr 1 BA Digital 3D Design	3D animation and Videogame design
3	20	B	NDD 3D Design Yr 1 BA Interior Design Yr 1 BA Digital 3D Design	Don't know yet
4	20	B	6 years Technical Drawing 2 years Art / High School Some Web Page Design Yr 1 BA Digital 3D Design	Computer animation and special effects
5	24	C	6 years Commercial Design Experience – Graphics & Marketing Yr 1 BA Digital 3D Design	Creativity
6	28	C	Yr 1 BA Digital 3D Design	3D Design Futurism

Designer Feedback: Table 2– Experiment description & Advice record

Student Number	Experiment description	For what reasons?	Advice / guidance received?	Rating of advice / guidance	Examples of advice/guidance given.
1	Thought provoking	It made you think beyond your own preferences & consider a different & in this case, much larger audience. It also provoked a response to different aspects of popular culture in attempting to reach a conclusion.	Yes	Helpful	When considering the nature of time in online games.
2	Interesting	It's been a good design exercise and we both enjoyed it and are happy with the result.	No		
3.	Educational	I found the experiment to be very challenging, especially in time limit. I was surprised by some of the survey answers, and found that aspect of it very educational.	Yes	Helpful	To look broadly at what we wanted to achieve, instead of focusing too much on an existing solution
					Contd/.....

Student Number	Experiment description	For what reasons?	Advice / guidance received?	Rating of advice / guidance	Examples of advice/guidance given.
4	Hard and somewhat frustrating	Hard because I am not a games person, I don't have a lot of interest in them. Frustrating because there is one game that I actually like that would be perfect for the brief, but of course we could not use it.	Yes	Helpful	We were trying to come up with a concept for a single game instead of a broader concept that could be applied to many games. Our supervisor helped us realise this and allowed us to move on.
5	'Kilroy'	Lots of discussion, lots of ideas, surrounded by cameras!	Yes	Helpful	Advice on target audience.
6	Cerebral	It is a step through your own mind for the benefit of others.	Yes	Essential	Advised on audience.

Designer Feedback: Table 3 – Design Activity and Process

Student Number	How did you find the process of recording your design activity?	Please state reasons	Did design activity follow a structured process	Did your process help or hinder your design activity and outcome?	Can you suggest any ways that would have helped your design activity or processes?
1	Easy	Once the idea was established, the concept was vast & presented few troubles in actually developing the idea further.	Yes	Once we arrived at our idea, the creative process became less 'structured' and took on a 'natural progression'.	The opportunity to speak to some 25-50 year olds, although we did consider largest demographic in our design process. I would also have liked to look into online gaming in terms of logistics and mechanics.
2	Easy	We wrote notes as we went along, putting ideas on paper straight away.	Yes	The structured process of design helped us during the experiment, especially the brainstorming and sketches.	No, I'm happy with the way we did it.
3	OK	Some areas, such as brainstorming were easier to record than discussions.	Yes	The process we followed, was not pre-determined, but followed a logical sequence.	I found the target audience to be too large, and the people we questioned did not, in my opinion, prove to be a good mix of the target audience.
					Contd/.....

Student Number	How did you find the process of recording your design activity?	Please state reasons	Did design activity follow a structured process	Did your process help or hinder your design activity and outcome?	Can you suggest any ways that would have helped your design activity or processes?
4	OK	We were a bit unsure of what had to be reported, but since we had to report everything I suppose it wasn't that hard.	Yes	The process we followed helped quite a lot. We started by making a questionnaire which gave us a good idea about what people from this age group expect from a game, what kind of games they prefer and why they still choose card and board games over computer games.	If we could have used a computer we could have prepared a better presentation sheet. It would also have been easier to show the other member of the group what the games we got inspiration from actually looked like.
5.	Difficult	Time constraints – 3 week project done in 3 hours.	Yes	Hinder – could have done with an extra 30 mins before going into library.	More time. Better specified target audience.
6	OK	Too many tangents.	Yes	Helped to manage tasks according to deadlines.	

Designer Feedback: Table 4 – Designers response to concept idea

Student Number	Were you happy with your final concept idea?	Please state reasons:
1	Yes	It is original, innovative and in our opinion, could be hugely popular (specifically with the target audience).
2	Yes	
3	Yes	It's a concept I thought would fit the audience, but had hoped to be able to reach a more specific result.
4	Yes	Although it is a broad idea, I think it suits the group of people (the target) just fine.
5	Yes	
6	Yes	

Appendix 5.9

Designer Feedback Session - Video Footage

6th May 2003

The video footage recording the Designer Feedback Session is located on a VHS tape, labelled Appendix 5.9, accessible through the research office at Kent Institute of Art & Design, Rochester, Kent.

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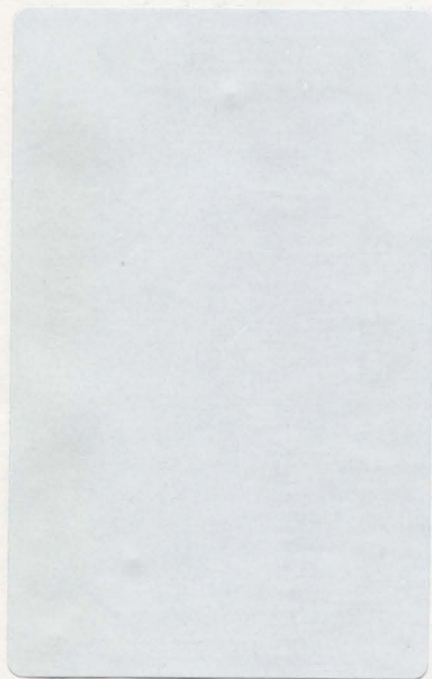
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