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National College of Art & Design
Dept. of Industrial Design

*Multimedia in Museums &
Galleries:*

Towards a new definition of the museum

by
Brenda Delaney

Submitted to the Faculty of History of Art & Design and Complementary
Studies in Candidacy for the Degree of Bachelor of Design,

1997

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Acknowledgements

I wish to acknowledge with sincere thanks the assistance given to me by my tutor, Paul Caffrey, in researching this thesis. I would also like to thank Teresa M. Breathnach for her helpful input and The Natural History Museum for their most appreciated assistance.

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LECTURE NOTES

PHYSICAL CHEMISTRY

LECTURE NOTES

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Introduction

The 19th century model of the museum still exists because it is a very powerful mechanism. It's all about the idea of meaning residing in the object and the museums role as unlocking that meaning. But we want to flip that around, because the meaning ultimately resides in people. The museum should be simply the catalyst (Bolger, 1993, p. 3).

The title of this thesis, "Multimedia in Museums and Galleries: Towards a new definition of the Museum", seems to suggest that the primary objective is the examination of the role of multiple media within cultural institutions. While in essence it does try to define the various applications of technology in the collection, display and interpretation etc. of objects of visual culture, it also strives to underline the greater subtleties of the role of the museum as a communicator of ideas, to researchers and the general public alike. This thesis aims to illustrate the importance of the education of the public, as a means of re-establishing its place in a society, which is increasingly demanding stimulation from other sources. It discusses the differences between passive and experiential learning and how interactivity within the museum environment allows the visitor to direct their own learning. It challenges the notion of the museum as a temple " a church like place of worship, the collections being worshipped, the visitors worshipping and the curator acting as a protector or a go between" (Breathnach, 1994, p 4), a place of glass cases and Latin labels, and argues that, while curatorial work of collecting artefacts of historical and social importance is necessary, interactive education as opposed to passive worshipping is the means by which such an institution can fulfill its role in modern society successfully. Interactivity allows the visitor to explore artworks, complex scientific theories and historical details at their own pace and in their own manner. While an interactive exhibit does not

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imply the use of multimedia, this technology has the ability to create diverse and numerous forms of experiences which can engage a visitors attention. However technology is only a tool and its correct application is where its success lies.

Multimedia technology has various potential uses within the museum, from desk top publication of information leaflets to the decription and recording of objects in the greatest detail, in regard to dimensions as well as colour and texture. However, the most interesting application lies within the communication of ideas through exhibits. Its correct implementation can benefit curators, researchers and the general public. Presently the objects on display, often represent only a small percentage of the museums collection, the remainder being kept in permanent storage. Although access can usually be provided for the specialist reseacher, if the entire collection can be stored on video disc the collection as a whole is immediately available to the gallery public. Databases can supply supplementary information which create a greater understanding of the object placing it within a social, historic or cultural context. The opportunities for multimedia are endless but what this thesis tries to highlight is how technology is often used for its own sake and not as a tool.

‘Technology a means to an end and not an end in itself’: This is the core arguement of this thesis. While establishing the numerous applications for technology in a museum environment it stresses the importance of having a clear brief i.e. focused aims and objectives, before a curator utilises, or a designer designs, an interactive exhibit or database. Museums in their efforts to dispel images of churches and Greek temples and encourage greater public interest, often blindly

1. The first part of the report is a general introduction to the project. It describes the purpose of the study and the objectives that were set at the beginning of the project.

2. The second part of the report is a detailed description of the methodology used in the study. It includes information about the data sources, the sampling method, and the statistical techniques that were used to analyze the data.

3. The third part of the report is a presentation of the results of the study. It includes a summary of the findings and a discussion of the implications of the results. The results are presented in a clear and concise manner, using tables and graphs where appropriate.

4. The fourth part of the report is a conclusion and a list of references. The conclusion summarizes the main findings of the study and provides a final statement on the importance of the research. The references list the sources of information used in the study.

5. The fifth part of the report is a list of appendices. These appendices contain additional information that is relevant to the study but is not included in the main body of the report. They may include raw data, detailed calculations, or other supporting materials.

6. The sixth part of the report is a list of figures and tables. These figures and tables provide a visual representation of the data and the results of the study. They are placed throughout the report to help the reader understand the findings more easily.

7. The seventh part of the report is a list of footnotes. These footnotes provide additional information about the study, such as the names of the researchers, the dates of the data collection, and the locations of the study sites.

8. The eighth part of the report is a list of acknowledgments. This section is used to thank the people and organizations that have supported the study. It may include the names of the funding agencies, the advisors, and the participants in the study.

9. The ninth part of the report is a list of references. This list provides a comprehensive list of the sources of information used in the study. It is placed at the end of the report to allow the reader to find the original sources of the information.

welcome a technology, they view as the way of the future. Undoubtedly in a world of home computers, lap tops and mobile phone/fax machines, computers cannot be ignored but to ignorantly embrace technology without considering the broader implications, is not the way forward. In the case of "The Earth Galleries", The Natural History Museum, London and the interactive exhibit, "Design a Toothbrush", Design Museum, London (the case studies chosen for this thesis), both utilise multimedia techniques to engage the visitors attention. Both employ characteristics of the entertainment and leisure industry, "The Earth Galleries" deriving its influences from shopping malls and video arcades and in the case of "Design a Toothbrush" the interactive program is based on a computer game. The difference lies, however in the fact that, in the Natural History Museums attempts to revitalise essentially "long dead, obsolete, relics or metaphors for some extinct or past society" (Schofield, 1993, p 3) through a sensory bombardment which questions whether the museum is becoming that with which it is trying to compete, a theme park. The Design Museum, on the other hand, uses technology to communicate an awareness of technology and as a result of a structured brief and design process it achieves an end product which draws upon popular culture to engage the user while still maintaining a strong educational element.

This study aims to provide a broad overview of the above points, studying in greater depth the forementioned exhibits. It aims to compare and contrast "The Earth Galleries" and "Design a Toothbrush" from an educational and entertainment perspective. Finally it questions the future of museums and how multimedia is, can and will define the role of museums and galleries in modern society. The structure which this thesis will take is as follows:

1. The first part of the report is a general introduction to the subject of the study.

2. The second part of the report is a detailed description of the methods used in the study.

3. The third part of the report is a detailed description of the results of the study.

4. The fourth part of the report is a detailed description of the conclusions of the study.

5. The fifth part of the report is a detailed description of the recommendations of the study.

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THESIS STRUCTURE

The early chapters will develop a theoretical framework within which a discussion of "The Earth Galleries" and "Design a Toothbrush" will be set. The first aims to offer a clear definition of the museum. It differentiates between the Art Museum, the Science Museum and the Natural History Museum and examines the various elements which contribute to exhibits as the public may experience them. It illustrates how various preconceptions held by people, who associate museums with temples, can be related to their origin and development, and how these associations can often deter a percentage of the public from visiting a museum or enjoying the experience. This chapter underpins the importance of education in cultural institutions, which are frequently subjected to critical analysis, by a public who are increasingly succumbing to the attractions of theme parks and video arcades. It then proceeds to examine the benefits of experiential, interactive learning above passive learning where the objects are viewed from a distance and inspire a sense of awe. Leading into the next chapter it establishes a connection between multimedia and interactive displays.

The second and third chapters offer a definition of multimedia and outlines the various applications within the museum environment. In particular, the second highlights some of the various, and sometimes unique advantages, associated with multimedia interactive exhibits and systems. Having defined multimedia, the third chapter examines the extent to which it influences our perceptions of the museum as an educator or an entertainer. It studies in greater detail, societies desire for sensory stimulation from the media, and how

Dear Sir,
I have the honor to acknowledge the receipt of your letter of the 14th inst. in relation to the above matter. I am sorry that I cannot give you a more definite answer at this time, but I am sure that you will understand the necessity of this delay. I am sure that you will be satisfied with the result of my investigation.

I am, Sir, very respectfully,
Yours truly,
J. B. [Signature]

Enclosed for you are the documents referred to in my letter of the 14th inst.

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Yours truly,
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I am, Sir, very respectfully,
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influences derived from popular culture, specifically the concept of the theme park, are infiltrating the museum and the way in which it communicates to the public.

One of the principal methods of researching this thesis has involved the selection of two case-studies, "The Earth Galleries" and "Design a Toothbrush". The fourth and fifth chapters examine the different ways in which multimedia is used in these exhibits. It compares the all encompassing experience, used by the Natural History Museum, which can be likened to Segaworld, with the interactive exhibit in the Design Museum. Also taking inspiration from the world of the computer game, "Design a Toothbrush" manages to create a completely different learning experience.

The sixth chapter deals with the process of designing an interactive exhibit. Step by step it moves through the various stages from defining the objectives to the design of the housing.

In conclusion, this study looks at the future of museums. It questions the extent to which museums will move towards entertainment at the expense of education. It concludes that the use of multimedia (when correctly implemented, and carefully planned in the beginning) can be beneficial, provided its use is primarily the reinforcement of the educational role of the museum.

LITERATURE SURVEY

Having broadly introduced the aims and objectives of this thesis it seems appropriate to offer a review of the literature upon which this study was based. The review spans museological literature, published

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in the last five years and textbook guides to understanding multimedia and its broad applications within the business, entertainment and the leisure/entertainment industry etc.

Helen Bolger in her thesis, "Museum as Educator" provides a useful and interesting insight into commonly held preconceptions of the museum, while in her article, "A Future of our museums", Mairead Dunlevy, provides a thorough and helpful examination of the origin and development of Museums and Galleries from Greek and Roman times. This clarifies how current preconceptions were adopted and how the role of the museum has gradually, over the years, expanded beyond mere collection and display to include the education of the general public. Of particular importance in gaining a basic understanding of the role of computer technology within the museum was Museum International. A collection of articles published in 1994 offer a comprehensive overview of the history of technology within the museum, its various applications within this environment, considerations involved in designing, choosing and incorporating multimedia into cultural institutes and examples of various case-studies within Europe and the United States. The same journal also published a series of essays in 1995 devoted to the study of exhibition design. These articles explain the importance of an exhibit as a means of communication and trace the evolution of exhibits from static displays in glass cases with Latin labels to multisensory experiences facilitated by advances in multimedia technology.

In researching the case-studies "The Earth Galleries" and "Design a Toothbrush" two articles were of great assistance. In the case of the former exhibit, Ronan Moore's publication "Goodbye architecture,

hello experience: From the Millenium Festival to the Natural History Museum, Experience design is the future”, clearly describes the interior of the Galleries and suggests the use of popular culture influences. It draws comparisons between Segaworld in Trocedero, and the exhibit, basing his argument on the use of an escalator within the interior and dramatic sound and visual effects. An article printed in Leonardo, 1991, “An Interactive Computer Video Game for the Design Museum: Using Technology to Teach Technology” by Rodin Baker was very useful in both the discussion of the “Design aToothbrush” exhibit and as a reference when detailing the stages of the design process involved in creating any interactive programme. As a member of the team involved in the design of the forementioned exhibit, the author of this article provides a valuable insight into the Design Museums aims and objectives and the influences employed in the design.

Schofield’s “Design Museums: A Critical View” was of particular interest when differentiating between Design Museums and Art Galleries, supporting the value of contextualisation when exhibiting designed objects.

Initially when defining Multimedia two books were of assistance: “Gateway to the Next Millenium” and “ An Introduction to Digital Media”. While both of these simplified the concept of multimedia to a basic, more comprehensible level, neither offered a definition specific to its application within the museum environment. Instead periodicals were more useful when sourcing this information.

‘Multimedia’ and ‘Museum’ being the keywords of the thesis imply the necessity for a volume of research. Both topics have been

On the 1st of January 1940, the British Government
announced that it had decided to evacuate the
children of British citizens living in Germany.
The evacuation was carried out in a very hasty
manner, and many of the children were placed
in the care of strangers. The British Government
was criticized for its handling of the evacuation,
and it was claimed that many of the children
were mistreated. The evacuation was a failure,
and it was a disaster for the children who
were involved.



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extensively written upon in both textbooks and journals. However, finding a more critical analysis of multimedia, museums and the connection between them was more difficult to access. In general most of the published sources failed to stress the importance of viewing multimedia as a tool for creating a successful interactive learning experience. Interaction allows a visitor to direct themselves and their own learning process but multimedia is only an aid which can facilitate interactivity and not the answer, in itself, to all the museums problems. This thesis tries to offer a more critical overview of multimedia within the museum and to fill the gaps identified in present published sources.

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Chapter 1

WHAT IS A MUSEUM ?

Chapter 1

DEFINING THE MUSEUM

A non-profitmaking, permanent institution in the service of society and its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of man and his environment....(Chieze, 1994, p. 30).

This is the definition of the museum as offered by the Statutes of ICOM, Article 2. It offers a clear description of the functions of the museum but in reality, equal emphasis is rarely spread between each. In the past the acquisition and exhibition of artefacts often outweighed the museum's desire to generate public understanding and appreciation of art and history. Today the museum must focus its attention towards the fulfillment of all its functions to justify its existence.

DIFFERENCES BETWEEN ART GALLERIES / MUSEUMS, SCIENCE MUSEUMS & NATURAL HISTORY MUSEUMS

More specifically the museum can be subdivided into three main groups i.e. the Art Museum / Gallery, the Science Museum and the National History Museum. In broad terms the above definition of function applies to all three, in reality, however, each have a different means of exhibiting, entertaining and educating.

In the Art Gallery / Museum, whether private or public, with a collection of either modern art or historical artifacts, a limited number of items, all of importance, communicate ideas or customs. Here, the language of the objects themselves, has always been the most prominent medium of communication used by such an institution. As

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such, the visitors should be allowed to come into direct contact with the objects to view them, and thereby draw their own inferences. In such exhibitions the effort is made not to highlight any single object, but rather to establish a close relationship between them. This allows the visitor to compare two objects with the same function but which differ in era, value or style etc.

Science / Natural History Museums, on the other hand are less reliant on valuable artefacts and more on the communication of complicated theories and processes. In the case of the Science Museum interactive exhibits i.e. "an exhibit where visitors could do something and somehow involve themselves themselves in the educational process," (Sickler, 1995, p. 37), are important. Users / Visitors can gain understandings of complex scientific theories, through everyday examples provided by interactive exhibits, which invite the visitor to experience science. For example in the Hall of Science, when designing the 'Colour & Light' educational computer installation, it was decided to use graphic representations and analogies that would describe a process or phenomenon apart from the support of technical diagrams, charts or jargon and the skills necessary to interpret them "For instance, to present the idea of diffraction, we create a landscape in which a rainstorm is followed by a rainbow - a product of the diffraction of light" (Zelevansky, 1990, p.14). In Natural History Museums, to fully understand an object, displays can provide supplementary information in the form of narrative or historical background, to contextualise the object.

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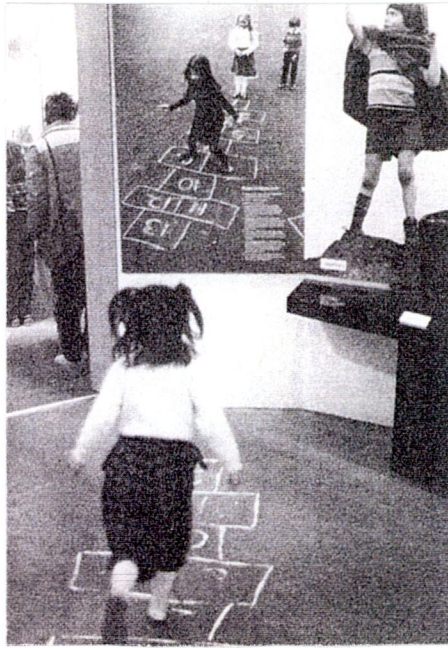


Fig. 1 Interactive Exhibit, *Hall of Biology*, Natural History Museum, London. Playground pattern demonstrated on photograph is immediately copied.

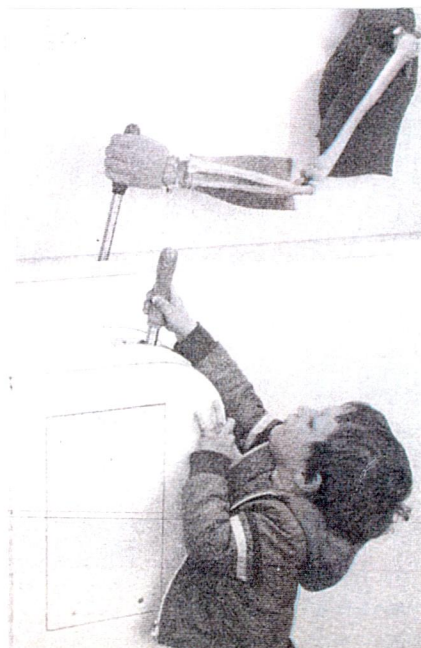
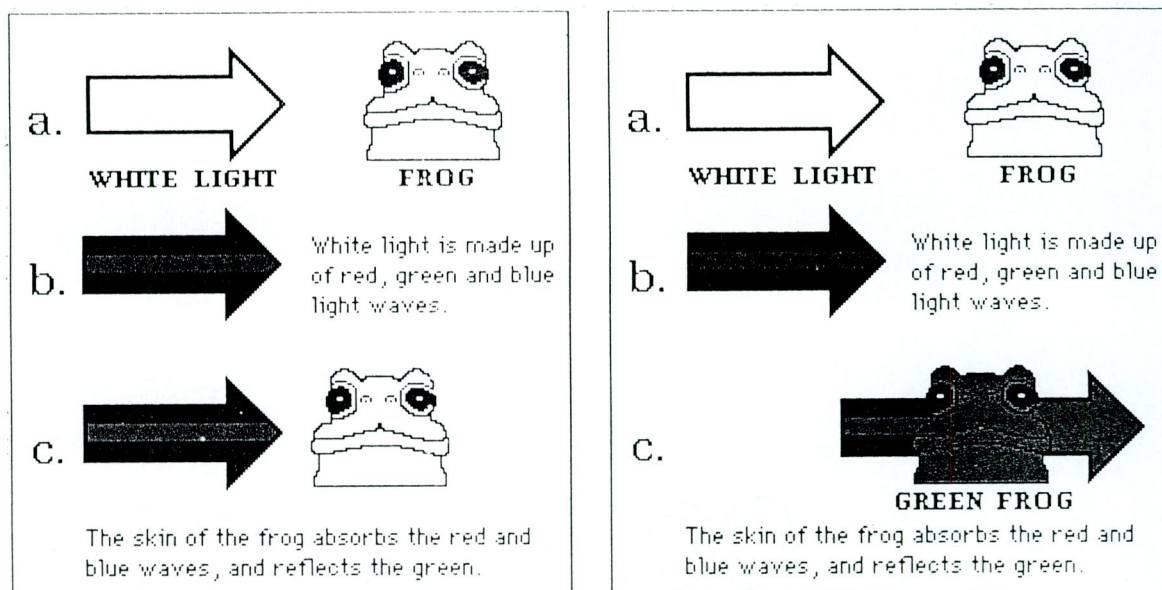


Fig. 2 Interactive Exhibit, *Hall of Human Biology*, Natural History Museum, London. Theory and practice together.



Diag. 1 Colour & Light , Interactive Educational Computer Installation, 1989. Detail from "Sources of Colour" section.

This animated diagram describes the process through which light is absorbed and colour reflected.

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In reality

Almost nothing displayed in museums was made to be seen in them. Museums provide an experience of most of the world's art and artefacts that does not bear even the remotest resemblance to what their makers intended (M.L., 1995, p. 3).

and as such, to provide the visitor with a fuller understanding of what they are viewing, contextualization is important. Without attempting to simulate the original environment of an object the context offered by the museum, "is different from the intended or expected one and this relates as much to anthropological artefacts to designed consumer products" (Schofield, 1993, p. 4)

To summarise, the decided difference between the Museum of Modern Art and other categories is that the Natural History Museum or Science Museum collections may well have prize items but no subject masterpieces. The collection, however is no less authentic; it is simply that the museum object does not stand on its own in the same way as a Van Gogh or Picasso. It loses its original meaning, only to regain significance for the public when relocated within its context. For this reason, to perform its educational functions, this kind of museum must seek a different approach to exhibiting.

PRECONCEPTIONS OF THE MUSEUM

Despite the quantity of information accessible in the museum general preconceptions held by many inhibit a large percentage of the public from availing of these facilities. According to research by Bourdieu, up to 66% of manual workers associate museums closely with churches and temples (Griffin, 1995, p. 6). Considering the history

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of galleries and museum it is understandable how such preconceptions originate.

The earliest museums known, those of the Greek and Roman worlds, were study collections and were intended for scholars, philosophers, historians and the serious-minded. Cathedral treasuries with their commissioned works of liturgical art and treasured reliquaries, however, replaced museums in the medieval period. This served to establish the status associated with custodians and the respect and awe inspired in visitors towards such institutions.

Private galleries of paintings and sculptures have their origins in the 16th century. Gentlemen privately displaying their acquisitions from the Grand tours of Europe inspired these galleries, the first of which, the Ashmolean, was established in 1683. This was the first private collection to become a museum and register its collection in a modern manner, and although mainly aimed at the studious, interested members of the public were admitted upon paying a fee of 6d [=2.5p].

The first London museum to open to the public was the Tower of London, and this was followed by the British Museum, in 1753, based on the collection of Sir Hans Sloane. It was his stipulation that his collection was "intended not only for the inspection and entertainment of the learned and the curious but for the general use and benefit of the public" (Dunlevy, 1996, p. 33), that seemed to first expand the role of the museum beyond that of safeguarding and displaying artefacts for the benefit of the learned.

By the late nineteenth century enthusiasm for educating the masses had grown and emphasis in international exhibitions shifted

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from "pure" education to entertainment. Museums began to employ different techniques of exhibiting their collections, with the view to entertaining the public:

If it was considered necessary to tell the public about Ancient Gaul, Egypt, steam pumps or chair design, then the best way to do so was by creating the exact environment in which those things occurred and letting the audience watch them happen (Dunlevy, 1996, p. 35).

Despite increasing consciousness of the museum's responsibility to the public many people remained to perceive it as a place for researchers and specialists and still associate it with its origins: Greek and Roman temples and later Cathedral treasuries. In truth, many galleries / museums, even some of those dating from the nineteenth century, were specifically designed to emphasise this link. Aiming to evoke a sense of awe in the visitor and respect for the artworks on display, buildings deliberately incorporated features reminiscent of churches and classical temples. However,

the self-justifying picture of the museum as a citadel of treasures - treasures imbued with beauty and meaning so evident that they need not be communicated may soon be as extinct as the dinosaur....(Spurgeon, 1994, p. 20).

Even in this rapidly changing world where the public wants more, many exhibits must still not be touched, a fact that is often underlined by uniformed attendants who carry out their duties in an authoritarian manner. In such an atmosphere it is difficult and unfair to expect a visitor to develop an affiliation with the artworks. In many museums the care and safeguarding of collections as well as research is the main priority. As summarised by Jean Muir (the couturier and former board member of the V&A), in 1986, some museums see their responsibility as to

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3. The third part of the paper is devoted to a discussion of the question of the influence of the external electric field on the structure of the atom.

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Lovely museum words ...
... and so the riches of the collections made more manifest
(Dunlevy, 1996, p. 31).

While this may illustrate one concept of the museum, the home of the muses, it tends also, to highlight how some members of the public may be intimidated by such an awe inspiring institution.

MUSEUMS: SUBJECT TO CRITICAL ANALYSIS

Consequently museums have been subjected to critical analysis and due to economic hardship they are now expected to define their role in the community, their function and potential, and to justify tax payers funding of the institute. Cultural institutions receive large government subsidies and museum administrators are forced to account for the existence of their institutions. The Director of the Irish Museum of Modern Art (IMMA) Declan McGonagle, says that:

The key to forging the link between gallery and community is education, it is education in the sense of mediating, opening up, understanding and engaging with the people (Bolger, 1993, p. 9).

Museums must focus more strongly on their educational role in society and thus re-establish the value of their existence for the public as a whole.

MUSEUM VISITORS: RESEARCHERS & CASUAL VISITORS

Museum visitors, at the moment can be broadly be divided into two groups. The first includes scholars, specialists and researchers who are motivated and have specific interests to pursue. The second category consists of the large number of casual visitors who just come

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4. The fourth part of the report is a discussion of the implications of the study. It includes a discussion of the theoretical and practical significance of the findings, and the limitations of the study.

5. The fifth part of the report is a summary of the study. It includes a brief overview of the main findings and conclusions, and a list of references.

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to visit the museum more or less at random, looking for things that interest them, with little background knowledge. Passing through museum portals everyday with scant knowledge and low expectations, the museum curator must first, impart knowledge and secondly create a sense of pleasure to satisfy the maximum number of visitors thus encouraging future visits.

Academics and specialists, too close to their specialized field of knowledge often fail to consider the expectations of the ordinary visitor. Consequently many visitors leave feeling a mixture of disagreement and disenchantment. When given no guidance, visitors are inclined to spend very little time looking at the objects and the few short seconds are rapidly reduced after the first two or three display cases. To slow down the process of looking at the objects the visitor must be motivated and interested. Once attention is gained the visitor will be "sure to discover the unknown phenomena with greater inquisitiveness and vigour" (Nigam, 1995, p. 23).

ELIMINATION OF PASSIVE LEARNING SITUATIONS

One means of eliminating a passive learning situation, thus eliminating confusion, boredom and fear of the museum, is to link historical knowledge with the creative process of personal interaction so that the learning process becomes not a chore but an experience. Interactive installations, for example, allow the visitor to be active, to ask the questions and to seek information themselves. New forms of technology are now facilitating this change. Multimedia is a word that is recently mentioned frequently in the same breath as museums. New

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electronic media are ensuring that visitors are increasingly drawn into the very heart of an exhibit, where they can participate and react.

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Chapter 2

WHAT IS MULTIMEDIA?

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Chapter 2

DEFINITION OF MULTIMEDIA

The uses for multimedia are so numerous and diverse (with potential applications in all areas of life) that the term eludes definition. It is a term that takes on vastly different meanings to different groups of people. Yet it is important to establish a working definition of multimedia (with particular reference to its applications within the museum, for the purpose of this thesis).

Multimedia must not be confused with the simple conversion of information to the digital realm as, in addition to the simple storage and distribution of multiple media types, it implies a high degree of structure in the data and must permit the user a level of interactivity.

As offered by the Museum Documentation Association the term 'multimedia' describes

a computer program for education and/or entertainment that allows interactive non-linear navigation through the content and includes at least three of the following media elements: text, still images, animated images, sound, video (Weston, 1995, p. 9).

This definition strives to offer a concise interpretation of the concept of multimedia but a fuller understanding is only acquired after a more in depth examination of its particular applications within the museum.

Compared with many organisations, museums have been slow to adopt multimedia systems until recent years. However, the advent of new technologies and general acceptance of computers as a valuable

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addition to the museum environment, has changed the situation, resulting in a rapidly growing level of multimedia use.

"The initial impetus to computerize usually came from curators concerned with collections management and and documentation of object collections" (Roberts, 1994, p. 4). This interest has now diversified into more general business and office use, ranging from the most basic printing of leaflets to publicise an event to a multisensory interactive exhibit as that currently in "The Earth Galleries" in London. Good quality signs and tickets can be produced by desk-top publishing, dynamic video displays can draw attention to the days events, and touch screen guides can allow visitors to find their way around and learn what the museum has to offer.

Multimedia is a particularly useful technology for managing a library collection as digital surrogates can be used to make fragile or popular items (such as early books, manuscripts and prints) more accessible, without danger to the originals. At the present time, objects on exhibit often reflect only a fraction of the museum's permanent collection. For a variety of reasons ranging from the fragility, or the value of the objects themselves, to restricted exhibition space, museum objects are kept in storage denying visitors access to a wealth of extra knowledge. If these objects are photographed and stored on video, the entire collection becomes immediately available, while the objects themselves can remain safely in storage. These video discs can be offered on sale, providing the visitor with the option of taking the collection home and viewing it later. In addition objects in other collections, can be brought on display and applications within business administration such as financial and gallery management can make

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successful use of multimedia to liberate staff from burdensome and repetitive tasks

Educational CD-Roms featuring images, text, sound and moving images allow the wonders of the museum to enter the homes of the increasing number of PC owners, 'In the UK alone around 3 million householders have personal computers, and a further 650,000 are expected to acquire them this year,' (Weston, 1995, p. 9). The phenomenal growth of the Internet has not escaped the museums attention. Museums and galleries online permit users to browse through virtual museums and provide numerous opportunities for advertising events and exhibitions. Electronic bulletin boards, the most famous being *Ask Dr Dino*, run by Wendy Wasman, the Librarian of the Museum of natural History, invites questions and provides answers on many natural history questions including geology and astronomy. "In April 1993, 466 questions and answers were available for browsing on-line" (Roberts, 1994, p. 25). The opportunities for multimedia applications are endless but the chief and probably most exciting use of this technology is to enhance gallery displays or to provide information about collections. Glass cases and latin labels are not enough anymore and multimedia can resemble the chaos of images, sounds, words, noises, which can build from imagination a more coherent understanding of an art exhibit or a scientific theory. Multimedia exhibits can facilitate a greater sense of interaction between the visitor and the objects themselves which up to now have often seemed intimidating to the visitor. Visitors can reach into the very heart of an exhibit, where, as mentioned earlier, they can participate and react.

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As can be seen, one of the important elements of multimedia systems, is the degree of interactivity. It is this element that offers the potential to create a new era in information, entertainment, and education. "Through interactivity, once dull, passive experiences will be transformed into something infinitely richer and more compelling" (Feldman, 1997, p. 13). Interactivity in a system is what gives the user some influence over access to information and a degree of control over the outcome of using the system. This usually involves the user making decisions which dictate the path followed through the information. Although interactivity of this kind places some control over access and outcome in the hands of the user, the degree of control can range from clicking with a mouse to participating in a virtual reality world. "The Seven Pillars of Interaction" as defined by Matthew J. Costello are further explored in Leonardo (Costello, 1996, pp. 401-403).

Designing interactivity for successful multimedia applications is a challenging undertaking but the potential results could be a compelling and powerful system. Multimedia Displays can provide a large body of information from many sources - sound and pictures, still and moving images, computer text and graphics - in a single disc. They can deliver information to suit the user requirements and abilities and when well designed they are interesting, responsive, fun and easy to use. Interactive systems can dynamically present objects, ideas and situations which are difficult to convey through static or linear media and they allow users to explore, study and compare information creatively and constructively.

ADVANTAGES OF INTERACTIVE MULTIMEDIA SYSTEMS

To summarise the following points are a list of the sometimes unique advantages offered by an interactive multimedia system (as provided by Library and Information Research Report 87 as prepared by the British Library) within the museum environment.

1. The system can hold a pool of basic information for all its users, and a variety of supplementary data for those who need it.
2. Interactive systems can give their audience the materials and tools to explore, compare, and discover information, features, and structures for themselves, to ask and answer questions, study facts and relationships and find advice and guidance.
3. When well designed, a package can meet a variety of different people's interests.
4. Multimedia systems provide a more sensory means of accessing information which is more memorable for the visitor.
5. Interactivity allows the user to create their own path of learning thus giving them greater control.
6. The interactive system can use its processing facilities to assess its success as an exhibit i.e. how often its contents are being used etc.
7. Interactive systems are relatively novel and more engaging of the user's attention than any passive learning situation.
8. Users who might be embarrassed asking basic questions may be more comfortable with a machine than a person.

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9. Multimedia systems can preform some of the more mundane tasks otherwise performed by museum staff.

10. The system is beyond the moods, prejudices and personal stresses which can effect the preformance of any guide, lecturer or curator etc.

Museums and galleries are well placed to exploit this new technology, both as a means of presenting collections that are too large, diverse or fragile for conventional displays, and for publishing scholarly work, reference material and resources for professional and educational consumer markets. Over the next number of years multimedia will play an increasingly important role in the museum and if implemented properly will prove benifical to museum staff, researchers and casual visitors alike.

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CONTINUED

Chapter 3

EDUCATOR OR ENTERTAINER ?

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Chapter 3

THE MUSEUM: A PLACE OF LEARNING AND ENTERTAINMENT

Although multimedia is important in many areas of the museum, a primary consideration of this thesis is the impact it is having towards the definition of museums as educators or entertainers. Firstly, however, it is important to examine in greater depth these two concepts i.e. education and entertainment, and the role multimedia experiences play in their reinforcement.

In a world where people are demanding greater stimulation in all aspects of their lives, an exhibit is only successful for the casual visitor if it is an experience that is valuable and memorable to them, something with which they can recall with some pleasure and feel that they have made some breakthrough in their perception of the objects or theories on exhibit.

If a work of art departs so far from the norm that it makes no sense to a viewer prepared to bring a degree of sympathy to its understanding, it has failed and so has the exhibition. If however, the work on show strikes a chord in the viewers responses, then it has begun to succeed, and it is at this level of common human understanding that our interpretations of past people find their legitimacy (Pearse, 1995, p.13).

In, striking this chord, multimedia experiences through the involvement of our senses - sight, touch, smell, hearing and kinesthesia, can render the museum a place of learning and entertainment.

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THE INFLUENCE OF POPULAR CULTURE

However, is this combination of education and entertainment through technology a product of 'popular culture'? Does it in some way reflect present trends in society?

Viewers today are captivated by the action and excitement on the TV screen and the fantasy world of the video arcade game. A new era of popular entertainment that will include theme parks where virtual reality and high tech simulations will present historic and futuristic attractions is forecast. People are demanding stimulation to such an extent that reality and hyper reality can barely be distinguished.

The following comparison might serve to indicate how dramatic the social influence of this development really is: the video game company Nintendo now has a larger yearly turnover than the entire record industry at its height in the seventies (Hewitt & Yelavich (Eds.), 1996, p. 31).

Computers are everywhere and it is naive to imagine that they will not be increasingly used as a vehicle for art and culture.

MUSEUMS IN COMPETITION WITH VIDEO ARCADES AND THEME PARKS

As museums strive to justify their existence by attracting ever increasing numbers of visitors, they are put in direct competition with theme parks and commercial dark ride institutions. To compete they are employing the use of multimedia multisensory exhibits. However the inspiration behind these exhibits is, in many situations directly taken from theme park / computer arcade. Museum technology is being 'dressed up' as popular entertainment, in much the same way as an early television was 'dressed' as a radio with a picture. As a partial result of our fear of new technology, we tend to disguise it as something

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familiar, but the metaphorical use of the video arcade game in the museum may be more a product of increased disinterest in an institution associated with temples and churches. To educate the public the museum is resorting to the tricks already in use in other areas of life.

MULTIMEDIA: A MEANS TO AN END AND NOT AN END IN ITSELF

Although technology is essential to the progressive museum, it is important not to neglect education in favour of entertainment. If a museum attracts a visitors attention but fails to educate them or increase their desire for knowledge, the museum has not succeeded in fulfilling its function. Automation if wisely implemented can focus our view of information as one of the key products of the museum, but the elements of entertainment it exploits must be used as a means to an end and not an end in itself. Computer games are fun, an escape from reality and, at times addictive. As described by a fourteen year old girl who said of a Sega computer game

it takes over your mind and you just get hooked on it 'til you've finished it.... It's an imaginary place where you can just relax and your mind goes free. Your mind gets loose and stuff (Neumark, 1995, p.304)

Video games do lend themselves to interactive play, which admittedly in the museum context can convert a passive learning experience into an interactive one, however to allow the museum to become yet another arcade or the theme park, is not the way forward. Education need not be exclusive of entertainment but museum curators must not forget, in their attempts to compete with theme parks, that education and the promotion of a greater understanding and appreciation of art and science is essentially one of their primary roles in society.

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Chapter 4

THE EARTH GALLERIES:
NATURAL HISTORY MUSEUM,
LONDON

SECRET

Chapter 4

THE EARTH GALLERIES: A MUSEUM OR A THEME PARK

As forementioned, museums, in certain instances, try to recreate the fantasies of theme parks and the 'magical' world of the video arcade. In "The Earth Galleries" in the Natural History Museum in London, for example, the experience created has more in common with Segaworld, in Trocadero, than with traditional associations with temples and churches.

Until recently, "The Earth Galleries" were known as the Geological Museum, whose main displays consisted of rocks, stones, minerals, precious stones, gems and fossils, both developed and undeveloped. "Some specimens will be bright, some highly polished: and some will appear to anyone but the subject specialist like very dull lumps indeed" (Hall, 1992, p. 165). In order to counteract the casual preconceptions of science as boring, the Natural History Museum, funded by the National lottery renamed the exhibit, and in the place of pieces of stone "...lined up next next to typed labels in Ministry of Works glass cases" (Moore, 1996, p. 3) a multisensory exhibit was created, which borrowed techniques from the armoury of themeparks.

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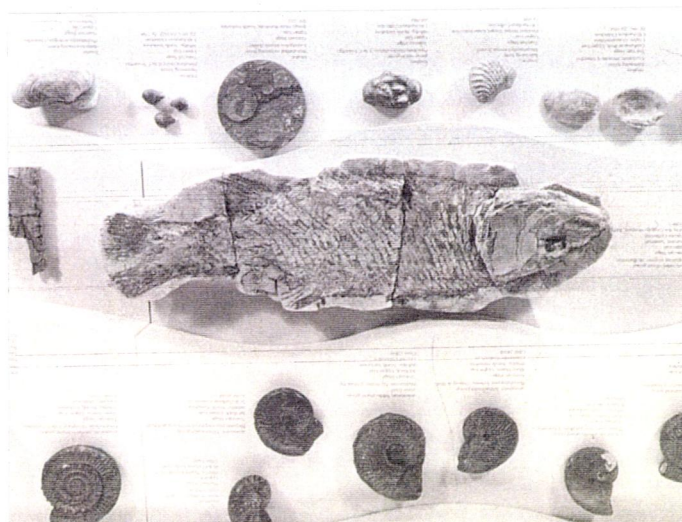


Fig. 3 *British Fossils*, Geological Museum, London.

Displaying strata in sloped table cases. Fossils mounted on stepped, painted backboards. Each Specimen is labeled in dry lettering.



Fig. 4 *Britian before Man*, Geological Museum, London. The rock specimens, firmly bolted to the shelf, are related directly to the text and views of the landscape behind.

DESCRIPTION OF THE EXHIBIT

Initial entrance into the Earth Galleries present the visitor with a sensitive carefully detailed 1990s adaptation of a 1930s vestibule. It is the design of John Pawson and demonstrates minimalist theories of truth to materials and meticulous attention to fine detailing. However it is not long before the visitor is bombarded by communal squealing, the like of which is heard in a public swimming pool.

Beyond the vestibule is a great black chasm of an atrium, with mythological figures in faux-verdigris on plinths in sub Danny Lane fractured glass. A deep thrumming noise, emitting from a great rotating sphere, plays base to the squealing's treble and a large up-only escalator fires excited mainly school age punters through an orifice in the sphere (Moore, 1996, p. 2).

The exhibit is more like a theatre production, involving characters, in the manner of the mythological figures with the theatrical thrumming noise to enhance the drama. The sound serves to lend a degree of authenticity to the exhibition but perhaps, more significantly, to enhance the sensory bombardment.

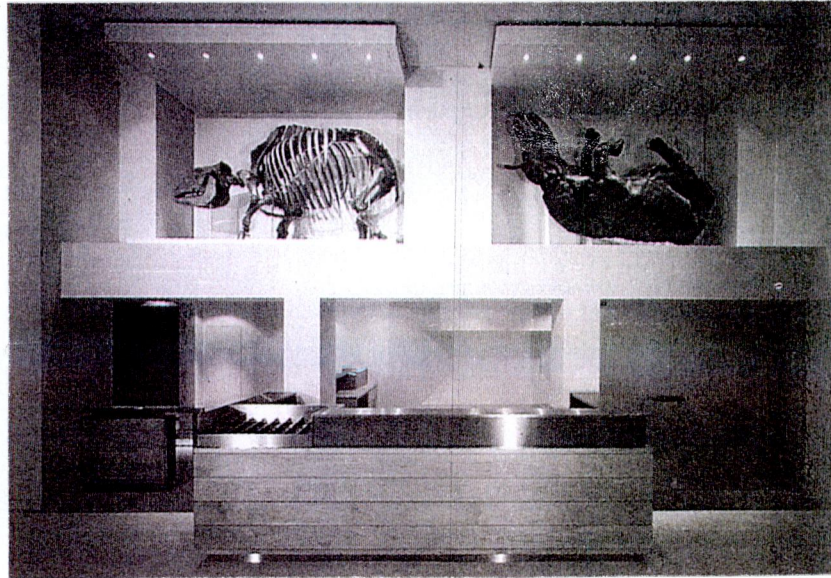


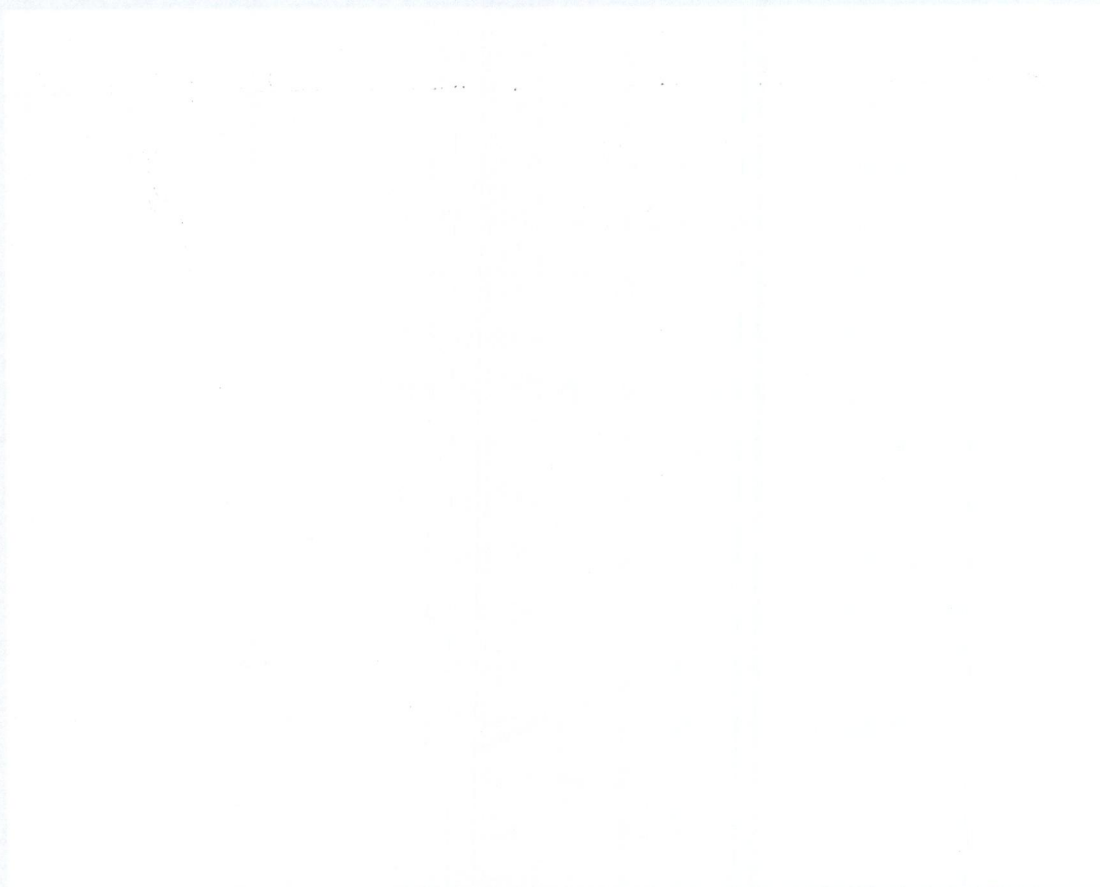
Fig. 5 Pawson Williams: Work at "The Earth Galleries". This exhibit adheres to a more traditional form of displaying exhibits.

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Fig. 6 Vestibule to “The Earth Galleries”. This opposes the multisensory exhibit in almost everyway.



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Fig. 7 Restless Surface: The Earth Galleries

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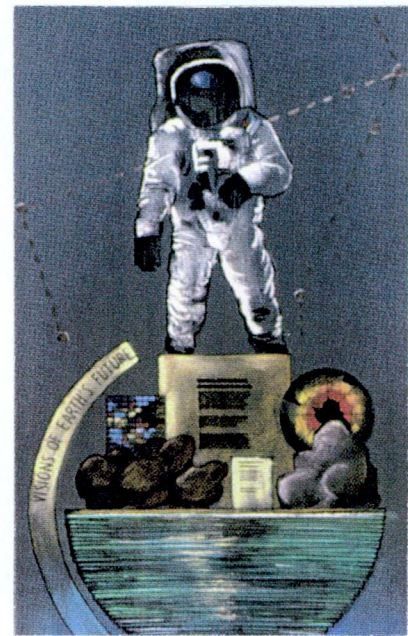
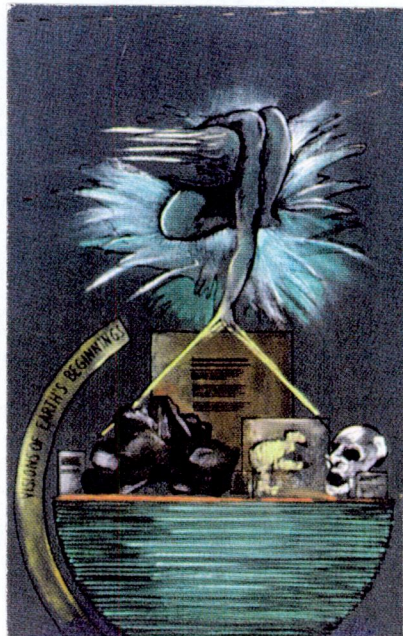


Fig. 8 Artist's Impressions of Visions of Earth Galleries and of Earths Future- two of the six iconic sculpture and specimen displays which introduce visitors to key themes.


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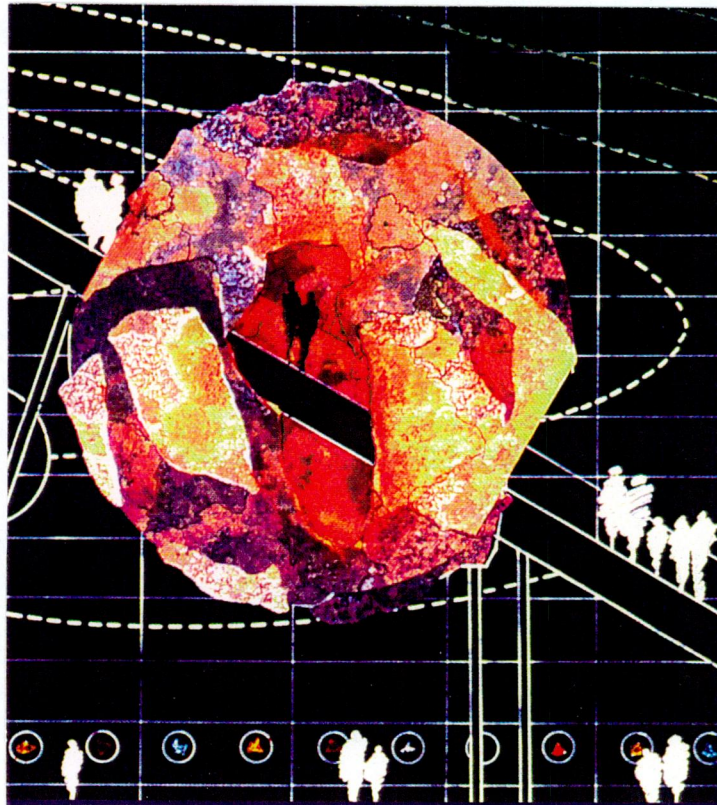


Fig. 9 The Visions of Earth atrium: vast walls of etched slate, inset with dramatic scapes of the solar system and the celestial atlas - will acknowledge the lead sponsors RTZ.

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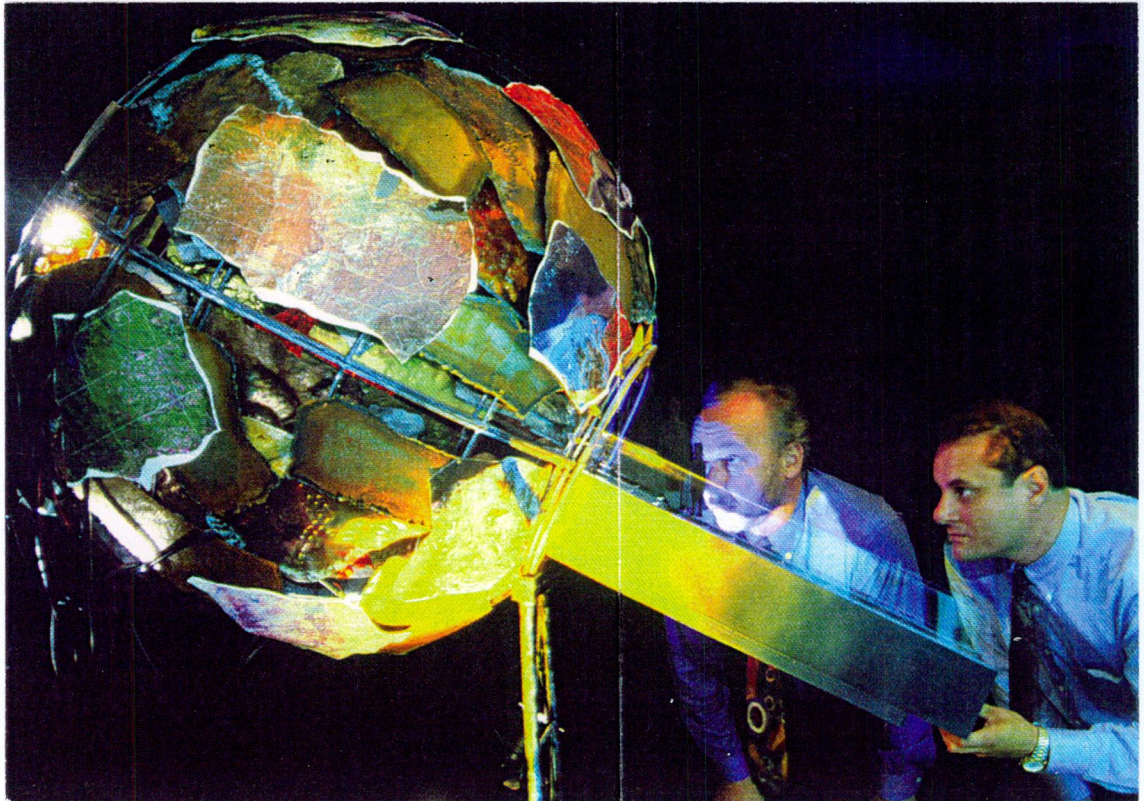


Fig. 10 Developing layers of materials and textures to represent Earth's onion-ring structure - designers with a model of the 11 metre globe sculpture.



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Fig. 11 Neal Potters atrium: "The Earth Galleries". This atrium initiates visitors to the Gallery via an escalator and a spinning globe.



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Fig. 12 Visions of earth in the Atrium



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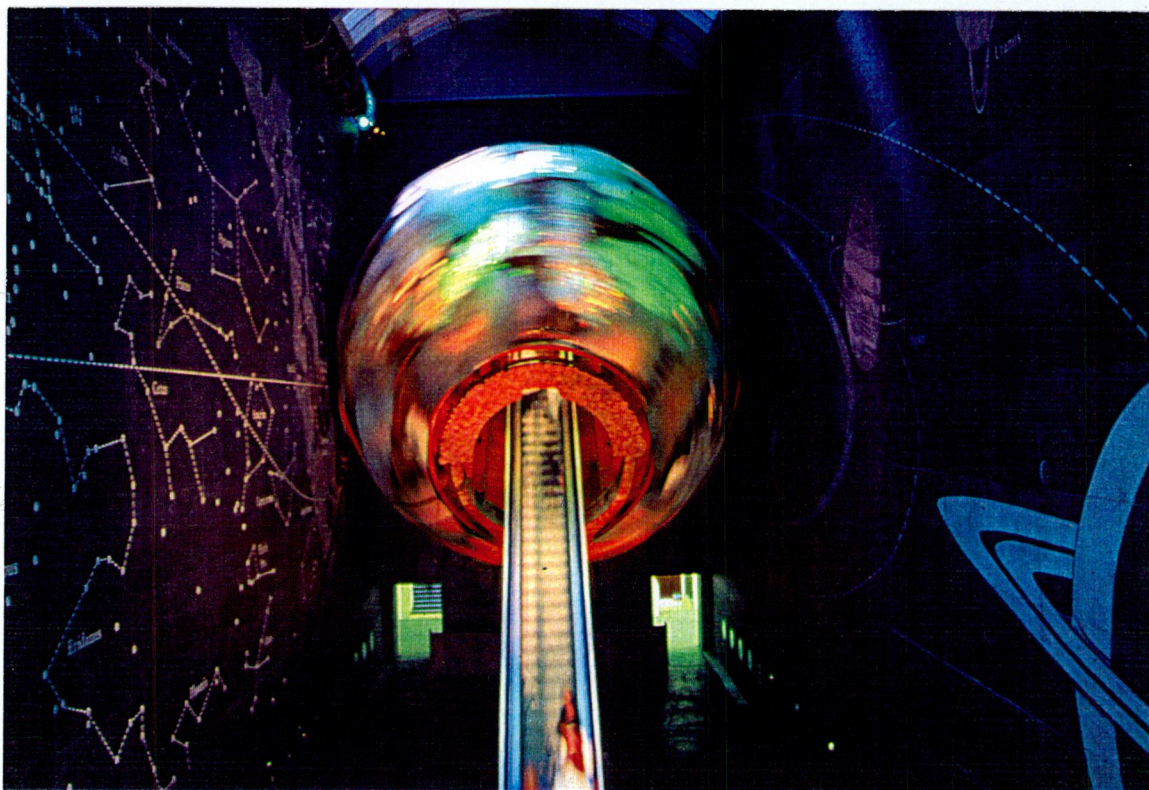


Fig. 13 Visions of the Earth in Atrium



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SIMILARITIES WITH THE SHOPPING MALL

Another dramatic aspect of the exhibition is the escalator which carries the viewer to the highest points of the building. From there, they are encouraged to walk down, slowly back past the display cases, similar in manner to the way in which a shopper browses a number of shop windows. However this comparison is not necessarily a reassuring one.

The 1980s made it fashionable to proclaim the end of progress in culture - culture being defined as the sum of the products and images that we consume in our daily lives (Thackara, 1996, p. 160).

The increased desire in today's world for the consumption of superfluous objects (as promoted by elaborate marketing campaigns, dazzling shopping malls & enticing shop windows) is, according to some critics the cause of "the death of the subject, the death of art, the death of reason, and the particularly fatuous 'end of history' " (Thackara, 1996, p. 160).

Although this may be perceived as an extremist point of view, there can be no doubt that, the seduction of pleasure and the addiction to comfort, as created by the increased consumption of more and more products, is affecting our cultural identity. In this world of consumers, appreciation of art, history and family values is becoming lost. People all too often forget their identity (as defined by their cultural background) to become part of an all encompassing global consumer market.

.... in America, where adults average six hours of shopping each week, as against forty minutes or playing time with their children, 40 percent of shoppers say they have quite a lot of unopened purchases stored at home! (Thackara, 1996, p. 160).





Fig. 14 Visitors ascend from Visions of Earth in the Atrium on a symbolic journey through the Earth.

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BOMBARDMENT OF THE SENSES

The displays themselves engage the senses through a bombardment of still and moving pictures written and spoken words, sounds of eruptions and explosions, with devices for feeling wind or coldness and every 104 seconds, with a partial recreation of the 1995 Kobe earthquake. The noisy dramatic simulations combine to create so many of the traits, seen in theme parks. Similarly, in Segaworld, an escalator projects visitors through an orifice to the top floor where multimedia envelopes them into a fantasy world and just as the occasional real rock provides a touchstone of reality in "The Earth Galleries" a real Harrier Jet performs the same function in Segaworld. Reality and fiction are entermeshed. However, while a theme park does not strive towards education the museum does. "The Earth Galleries" succeed in enticing the public into a domain they may otherwise be reluctant to enter, but do the visitors leave with any knowledge extra to that which they possessed when they first arrived? Multimedia is certainly stimulating but if it relies too much on entertainment the original purpose of the museum is lost. Just as in a Science Museum where an exciting, 'fun', exhibit can somehow mask the complexities and importance of certain scientific concepts and theories, "The Earth Galleries" do, through the use of exciting simulations, which tend to diminish the catastrophe of 5,000 people dying in the Kobe earthquake. It is important that an exhibit should not distract from such harsh realities.

However a return to glass cases, Latin labels and sparsely populated exhibits with the use of multimedia suspended, is not the answer. Interactive displays offer great opportunities to museums but the exhibition designers challenge is now "to make experience design

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deal with things like ethics, awe, contemplation and mystery. This is tough since it comes from a world that only cares about excitement" (Moore, 1996, p. 4).

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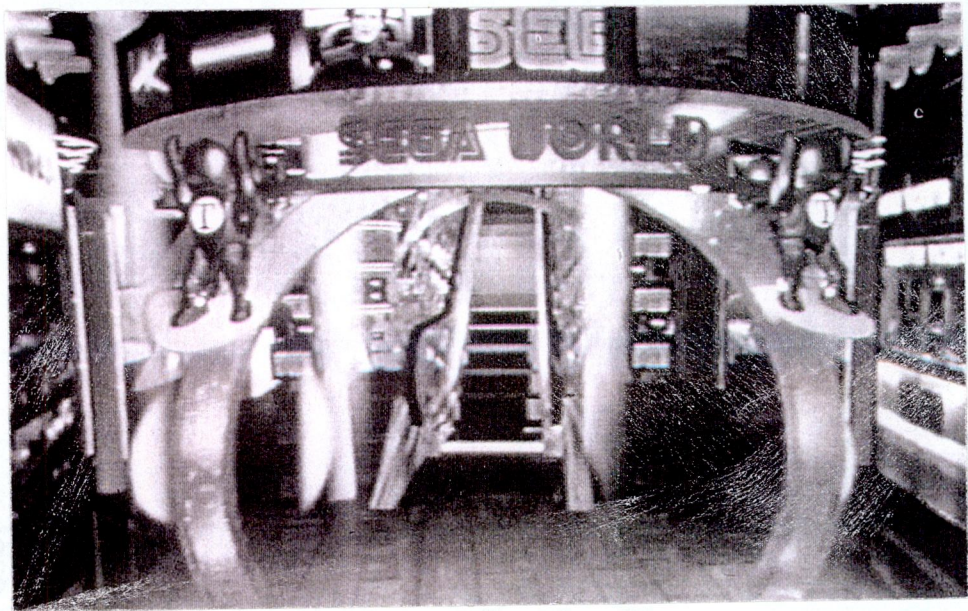


Fig. 15 Segaworld in Tropicana. This is one of the largest theme parks in the world. Similarities can be drawn between it and "The Earth Galleries".





Fig. 16 Recreation of an earthquake-hit shop in Kobe.

This offers a more theatrical approach to exhibition display.



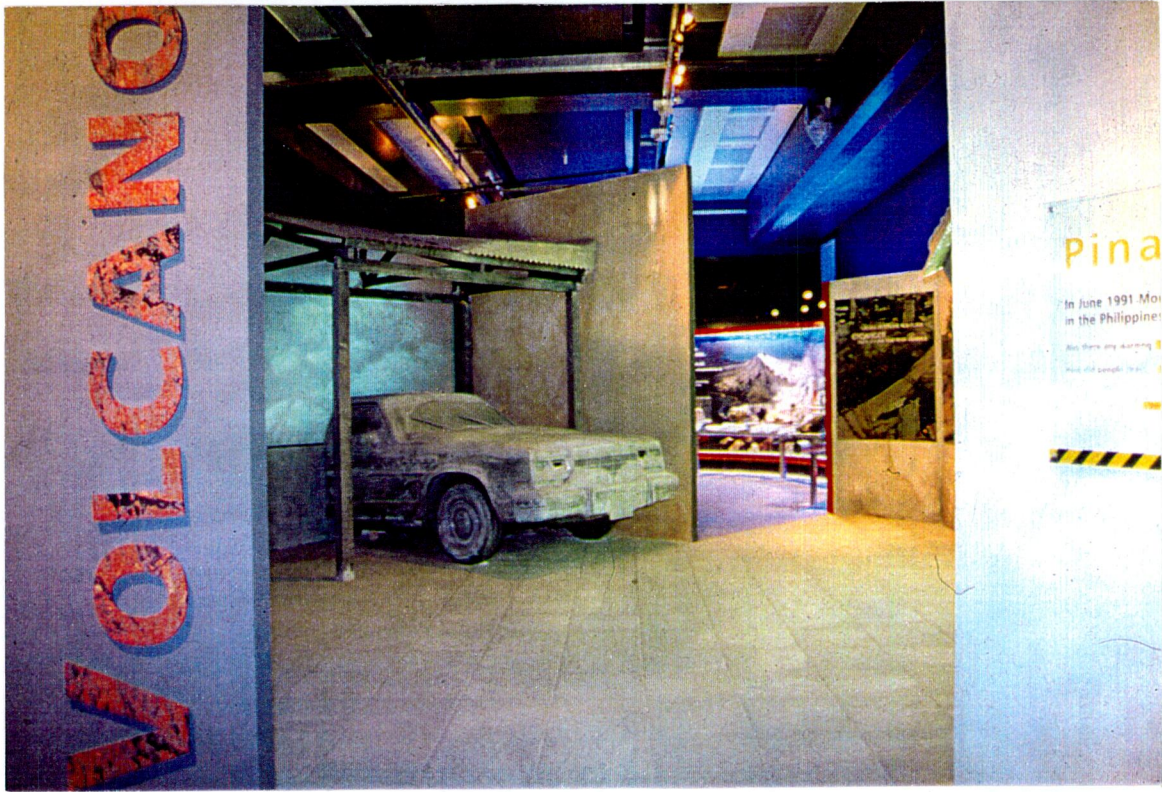


Fig. 17 Volcano Experience



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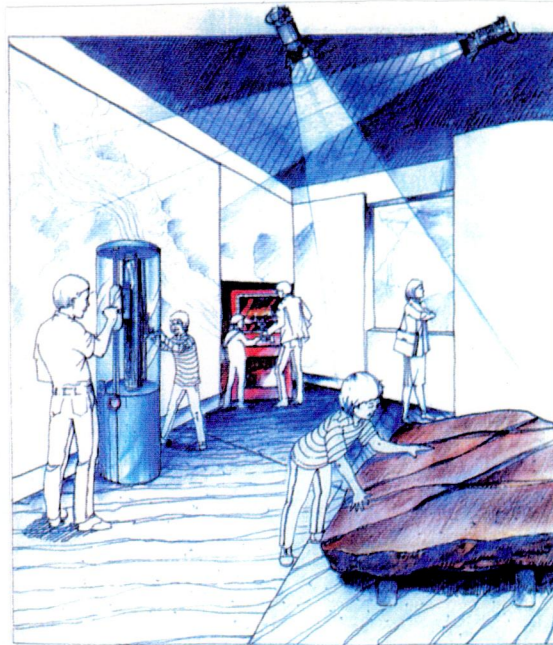


Fig. 18 Interactive Experience: Hands on experiences for children and adults.

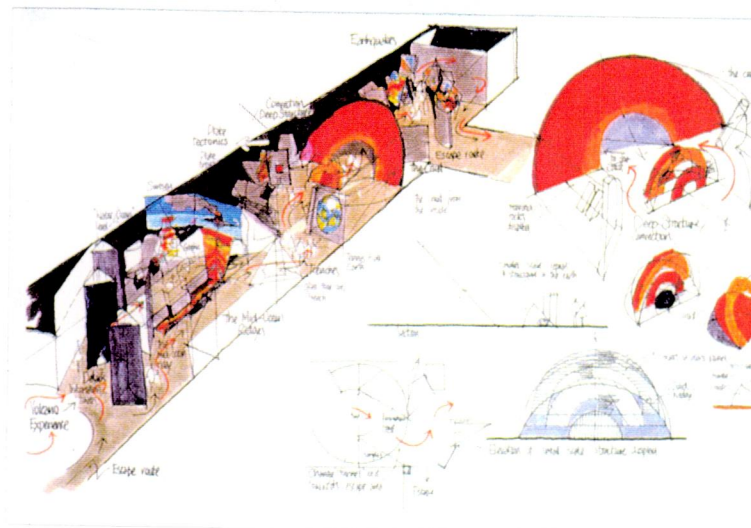


Fig. 20 Sketches of the Exhibit: Specimens from the Museum's collections combined with the latest exhibition techniques.

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Chapter 5

“DESIGNING A TOOTHBRUSH”:
THE DESIGN MUSEUM,
LONDON

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Fig. 10 The Car Programme, Boilerhouse, Victoria and Albert Museum, London. The Boilerhouse was the predecessor to the Design Museum.



Chapter 5

THE DESIGN MUSEUM

Although the Earth Galleries do demonstrate one possible means of using multiple media types within the museum environment another innovative use can be witnessed in the Design Museum, Butler's Wharf, London. In this museum a completely different approach to the application, of this diverse media exists.

The museum has two interactive displays - one using an IBM based interactive Laser Disc system, the other combining digitized still pictures with text on an Apple Macintosh..The former is a computer assisted package (CAD) which allows the user to "Design a Toothbrush" (to be examined in greater depth later) while the latter is a resource base for objects within the Study Collection. This is a responsive, inexpensive easy to update system and acts as a complementary resource to the objects themselves which are stored in adjacent display cabinets. The system is silent, which suits its purpose. Six menus introduce designers, manufactures, movements, products, and indexes by country of all the entries in the system. A mouse on the desktop is used for browsing and choosing, while the system allows users to explore associations between people, ideas and movements at their own pace. Without the embarrassment of asking seemingly 'stupid' questions of museum staff, the visitor can, instead, interface with a user-friendly non judgemental multimedia database.

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SECRET

THE DESIGN MUSEUM: IT'S AIMS AND OBJECTIVES

The Design Museum is concerned with the history, practice, theory and future of design in massproduced consumer products and services. By popularising, explaining and critising manufacturing industry and working designers, by offering an international range of information, ideas, images which would hitherto have been uncoordinated or inaccessible, the Design Museum will help bring about a new relationship between industry, commerce and the public. It will be a showcase, a marketplace and an auditorium, a highly visible bridge between two cultures (Baker, 1991, p. 427)

The Design Museum attempts to offer a range of resources that designers, industrialists and businesspersons may draw upon to create better products, while providing students with a stimulating environment in which to view, experience and evaluate the design process. The new museum contains a small permanent collection of twentieth-century objects. On the lower floors one finds a gallery that houses newly designed products. In addition the museum has a library, a small exhibition gallery and a section demonstrating the use of technology in design.

"DESIGN A TOOTHBRUSH": AN INTERACTIVE DISPLAY GAME CONCEPT

Part of the Museum's task was to explain the role of technology in the design and manufacturing process. To illustrate this aspect of design it was decided to use technology to teach awareness of technology. As in the Earth Galleries it was decided to use the entertainment industry as inspiration and in this case the concept of the computer game was chosen to engage the audience. The designers hoped to create an interactive exhibit that would be as successful as an

1. The first part of the document is a letter from the President of the United States to the Congress.

2. The second part is a report from the Secretary of the Department of the Interior.

3. The third part is a report from the Secretary of the Department of the Treasury.

4. The fourth part is a report from the Secretary of the Department of the Army.

5. The fifth part is a report from the Secretary of the Department of the Navy.

6. The sixth part is a report from the Secretary of the Department of the Air Force.

7. The seventh part is a report from the Secretary of the Department of the Coast Guard.

8. The eighth part is a report from the Secretary of the Department of the Marine Corps.

9. The ninth part is a report from the Secretary of the Department of the Army.

10. The tenth part is a report from the Secretary of the Department of the Navy.

11. The eleventh part is a report from the Secretary of the Department of the Air Force.

12. The twelfth part is a report from the Secretary of the Department of the Coast Guard.

13. The thirteenth part is a report from the Secretary of the Department of the Marine Corps.

14. The fourteenth part is a report from the Secretary of the Department of the Army.

15. The fifteenth part is a report from the Secretary of the Department of the Navy.

16. The sixteenth part is a report from the Secretary of the Department of the Air Force.

17. The seventeenth part is a report from the Secretary of the Department of the Coast Guard.

18. The eighteenth part is a report from the Secretary of the Department of the Marine Corps.

19. The nineteenth part is a report from the Secretary of the Department of the Army.

20. The twentieth part is a report from the Secretary of the Department of the Navy.

21. The twenty-first part is a report from the Secretary of the Department of the Air Force.

22. The twenty-second part is a report from the Secretary of the Department of the Coast Guard.

23. The twenty-third part is a report from the Secretary of the Department of the Marine Corps.

24. The twenty-fourth part is a report from the Secretary of the Department of the Army.

25. The twenty-fifth part is a report from the Secretary of the Department of the Navy.

26. The twenty-sixth part is a report from the Secretary of the Department of the Air Force.

27. The twenty-seventh part is a report from the Secretary of the Department of the Coast Guard.

28. The twenty-eighth part is a report from the Secretary of the Department of the Marine Corps.

29. The twenty-ninth part is a report from the Secretary of the Department of the Army.

30. The thirtieth part is a report from the Secretary of the Department of the Navy.

arcade game in engaging the visitors attention but could still give them a realistic understanding of the complex nature of design.

A computer aided design (CAD) system was selected, as the final image that would be visually interesting to the user, providing them with a rendered 3-D model at the end of the 'game'. However, in reality CAD and 3-D studio require alot of time, patience and skill and because these characteristics are opposed to the nature of the game, the system had to be modified. In defining the exact structure of the game the broad considerations in real design situations were selected. The game was divided into introduction and three major sections: shape parameters, mechanics and marketing while cost factors were seen as influencing all of these areas. Having constructed the basic model a more detailed account was designed.

GAME INTERFACE

Having decided on the software, identified the projected user group (7 to 16 year old students who would have a degree of computer knowledge from school and arcades) and outlined the overall system the next step was the selection of the hardware. This stage proved just as important to the successful design of the interactive exhibit as previous ones. A number of design decisions were made that provided the graphic structure. Interaction with the game was constructed via a resistive membrane touch screen to eliminate all keyboard work, thus facilitating a more direct form of interaction; pointing and touching. It was hoped that this system would be less intimidating for a user who might not be familiar with computers and would have been 'put off' by a keyboard. Touch screens do, however, carry with them their own set of disadvantages. They are fast but somewhat inaccurate. Sometimes

My dear Mr. [Name] -

I have just received your letter of the 14th inst.

and am glad to hear from you.

I am sorry that I cannot write you more fully.

I am very busy at present.

I am, however, very glad to hear from you.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

[Name]

P.S. - I am sorry that I cannot write you more fully.

I am, very truly, your friend,

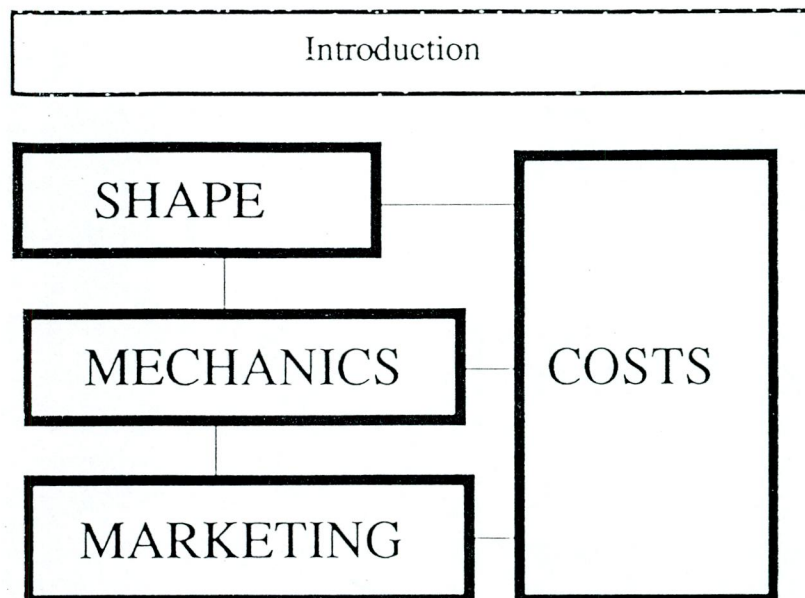
they are too sensitive and end up frustrating the user and as such, it is often advantageous to find a screen which responds to a firm touch, but resists environmental interferences. In the case of the Design Museum, the buttons were designed large and spaced well enough apart so that inaccuracy did not matter and the location, form and colour of each button type remained the same so that the screen would be consistent and confirm the users expectations of appearance and behaviour.

For the player to process at a rate suitable for gaining an understanding of the game, an additional button for CONTINUE was included to allow for a pause. However it had to be possible to distinguish between a genuine pause and disinterest in continuing with the game. A simple time lapse after which a warning was provided, gave the solution. If no input is recieved by the computer the game cancels after 20 seconds (a bleep is added to ensure that the correct choice has been made) .

Just as the inclusion of real rocks in "The Earth Galleries" exhibit or the Harrier Jet in Segaworld offers a suggestion of reality the game tries to establish a relationship between time and money. This was achieved by setting aside a rectangular area in the top right hand corner of the screen for a money clock that counts down the budget figure of £4,500 as the game proceeds. This gives the user a constant reminder of the costs involved in the design activity as well as providing an incentive to design an object, that both complies with the brief and is acceptable to the client, as quickly as possible.

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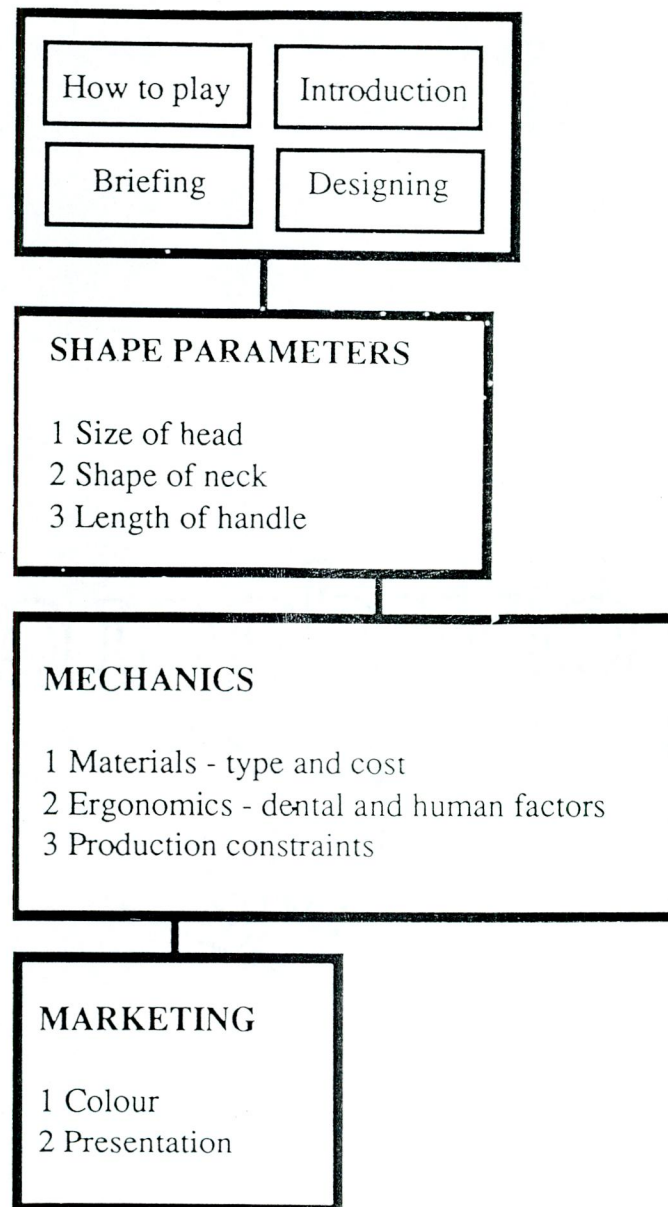
7-11



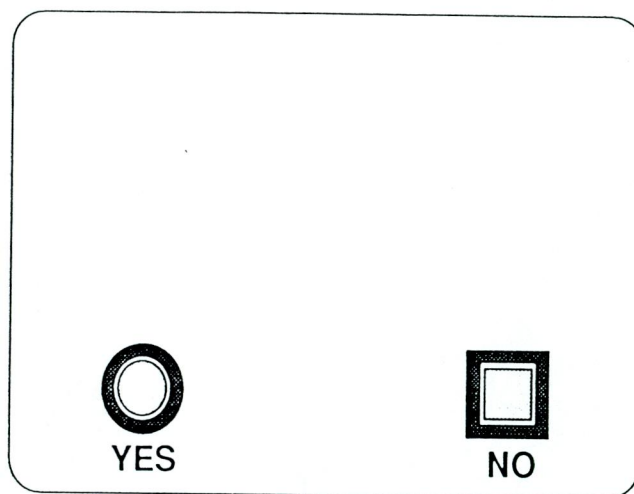
Diag. 2 Model of the basic structure of the game, showing the relationship between each of the components. The cost factors are seen as influencing the shape parameters, mechanics and marketing.



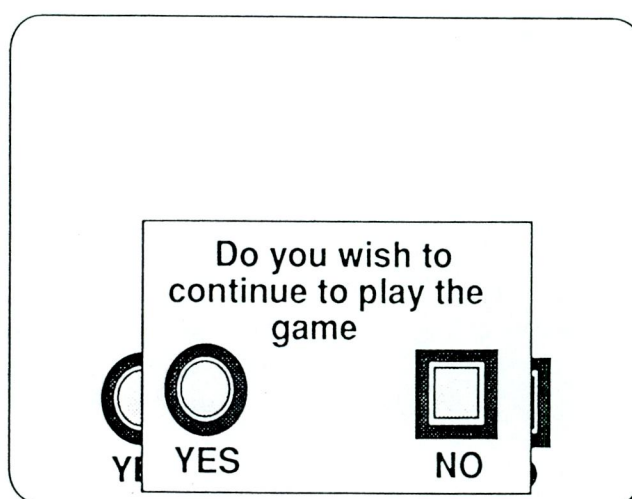
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Diag. 3 Detailed view of the content of the game model, illustrating the breakdown of the various components.



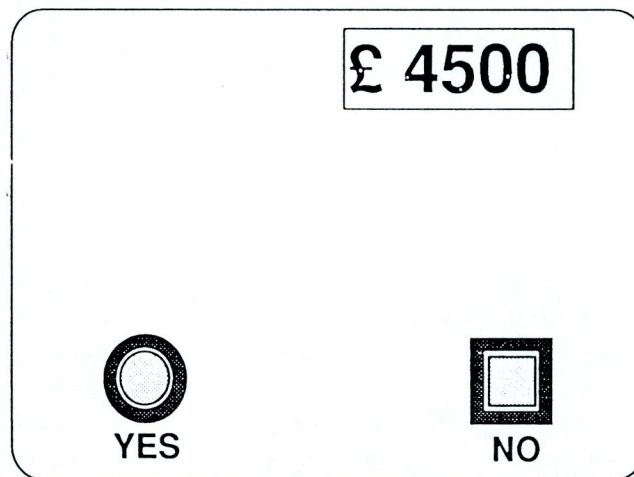
Diag. 4 Lower section of the screen: This designated button area allows the user to interact with the game. To make a clear distinction between the YES and NO buttons, the YES buttons were green and circular and the No buttons red and square. Each button is approximately the size of a fingerprint.



Diag. 5 Message which appears before game defaults to the beginning.

COBOL

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Diag. 6 Detail of money clock in top right hand corner of screen. The clock counts down from £4500 as soon as the design part of the game is initiated. This provides a constant reminder to the user of the costs involved in designing an object.

GAME STRUCTURE

The final game consisted of an initial loop that gives the title followed by the credits and sponsors. This moves through the screens until a START button is pressed and the game begins. The player is offered four choice buttons.

HOW TO PLAY	(Explains what the buttons mean)
INTRODUCTION	(Explains the role and position computers in design)
BRIEFING	(Sets the purpose of a design brief)
DESIGNING	(Allows the player to use the CAD system to design a product)

These buttons must be accessed in the correct order thus ensuring that the visitor does not bypass the important introductions to the design process in the haste to commence the game. Upon commencing the player assumes the role of the designer. The game follows the natural design process and initially provides the player with the brief in which the parameters of the design are established.

SHAPE PARAMETERS

When designing the form of the toothbrush the 'designer' is allowed to make three major alterations to the three parts of the brush: the head, the handle and the shape of the neck.

CONDENSER



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Choices between two head sizes, two handle sizes and four neck shapes are given. Having finished the look of the brush i.e. the aesthetics, the player must select a material.

MECHANICS

A brief description of the main properties of four materials: Polystyrene, Nylon, Polycarbonate, Polystyrene San is given. Only one of the selections is correct, the others failing on counts of expense, strength and opaqueness.

The next analysis involves dental ergonomics and finally the calculation of the amounts of material and a simulated finite element analysis. These analysis sequences serve to illustrate the various ways in which computing can aid the designer in producing an acceptable design. An explanation of the manufacturing process is also provided.

MARKETING

The next stage in design, i.e. the marketing, is represented by the final choice of colour. Market research information about customer preferences is noted in the brief and the player is expected to make an informed decision.

Finally if all the correct choices have been made within the budget the object is rendered and a hardcopy is produced as a souvenir for the visitor to take home. This acts as remuneration for the players successful interaction with the game.

CONCISE



EVALUATION

"So far the exhibit has been a huge success and is being played by about a third of the museums visitors"(Baker, 1991, p. 43).

Admittedly a certain percentage of visitors use the system as a popular diversion, as a means of pure entertainment but the user learns a toothbrush is more than just a toothbrush (i.e. an end product), but is instead a complicated, well thought out product of a structured design process. Also without this system to offer context many of the objects on display in the museum would be meaningless to the casual visitor. After all, for most people a kettle is just a kettle and the development work of the designer is rarely considered by the regular householder.

The game does however have certain short comings. It is not possible for the player to fine tune the shape where only a slight variation in shape is required and the time clock is not a realistic representation of the cost element in design. However it must be considered that for the casual visitor this is quite a comprehensive illustration of the basics of the design process and the importance of technology within it.

COMPARISONS BETWEEN THE INTERACTIVE DISPLAY "DESIGN A TOOTHBRUSH" AND "THE EARTH GALLERIES" EXHIBIT

Unlike the use of multimedia in the Earth Galleries, in the Design Museum, visitors are not bombarded with theatrical simulations which reinforce the entertainment function as opposed to the educational function. Irrelevant of the users reasons for playing the game they will leave with a better understanding of design. In this case the metaphor of the video arcade game has been successfully applied and prevented from overshadowing the educational purpose of the game.

CONDENSATION



In the Earth Galleries, however, the features of theme parks and shopping malls have been applied too literally and although admittedly the exhibit does attract the users attention does the visitor leave feeling they have learned something or purely that they have experienced a good time?

The example of "Design a Toothbrush" an interactive exhibit, also serves to illustrate the various and numerous considerations involved in designing a multimedia exhibit. It highlights the various steps which had to be undertaken to produce a successful result that serves to both educate and entertain. The next chapter, steps through the various stages and the numerous questions which the design team must ask themselves before undertaking the creation of a multimedia exhibit.

Condensation



Chapter 6

MULTIMEDIA EXHIBITS: THE DESIGN PROCESS

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Chapter 6

As in any field of design, the creation of an interactive display / multimedia exhibit, involves a clear strategy and a systematic approach. In order to produce a system which is both user friendly and fulfills its educational requirements, various steps must be undertaken. This may prove costly and time consuming but when thousands of pounds are involved (In the Design Museum the overall costs for "Design a Toothbrush" were in excess of £50,000) it is essential that outcome succeeds. The following is an outline of the steps involved and while these might vary in accordance with the project, it provides an overall view of the design process.

CHOOSING A TEAM

The first step in designing a multimedia system is the choosing of a team. Often to create an innovative system it is better to combine the talents of various professionals from different disciplines. Depending on the particular exhibit the system can consist of a sound engineer, an interaction designer, a graphic / animation artist, a programmer, an editor / writer as well as members of the museum staff. A broad professional and cultural background can prove very useful in the creation of a successful project, however, the team must have a project manager to co-ordinate activities. Coordination is of prime importance. "The project manager may be a staff member or a consultant but should be on site, committed to the task and experienced in museum systems implementation" (Perkins, 1984, p. 10). The project manager has to report directly to the museum, have ready access to management and professional staff and be able to react quickly and with authority. Because of the expense of such installations, costing anything from

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£5,000 to in excess of £500,000, planning and wise decision making is essential. A manager, under pressure of tight budgets, meagre resources and looming deadlines, will often demand systems and solutions immediately. However to successfully implement a major computer system the project manager must insure that various options are explored and only after careful consideration, is the final system settled upon. The design team for "Design a Toothbrush" included Adrian Ellis, Chief Executive; Helen Rees, Curator of the Design Museum; Robin Baker, Director of Computing, the Royal College of Art (RCA); Donald Hickey, graduate student at RCA; and Geoff Smith, programmer.

STAGES OF DESIGN

Having built the team the project must be structured. As in any other medium, a multimedia project falls into three stages: Concept, Design and Production. It is advisable to separate these three stages as much as possible as any major changes during the production can cause major time setbacks and prove very costly. It is important that each stage is focused and thoroughly thought out to avoid exceeding budgets and deadlines.

CONCEPT STAGE: AIMS AND OBJECTIVES

During the concept stage a clear concept is of utmost importance. Client (i.e. the museum), editors, designers and production staff have to know what the goal of the project is and every decision has to be based on it. Although it is a natural part of design to 'tweak' or modify the concept, any major changes can be time consuming and expensive. Unless the designers, themselves know exactly where the project is

It is a very common mistake to think that the
only way to get a good result is to work hard
and long hours. In fact, the most successful
people are those who work smart and use their
time wisely. They know when to stop and rest,
and they know how to prioritize their tasks.
They also know how to ask for help when they
need it. This is why they are able to achieve
more in less time.

Conclusion

In conclusion, the most important thing is to
keep going. Don't let a few setbacks stop you
from achieving your goals. Remember that success
is not a straight line. It is a journey with
many ups and downs. But if you stay focused
and keep working hard, you will eventually
reach your destination. So, don't give up.
Keep going. You can do it.

going it is hard to expect the user to comprehend what the system is trying to communicate.

Firstly the specific objectives should be stated by indicating the type of information to be accessed by the various categories of users. Next the various functions of the system should be identified. In the case of the Design Museum the main objective was to explain the use of information technology within the design process through the use of interactive techniques. The various functions were

to allow the user to generate a 3-d object,
to evaluate aspects of its performance
to look at production methods and materials
and to produce a hardcopy of the design.
(Baker, 1991, p. 428)

In most cases the basic functions can be isolated by answering three basic questions.

1. What will it be about ?
2. What do we want to say about the subject to the user?
3. What is the user interested in that will drive them through the product ?

THE USER

As indicated by the latter two questions the user is an important consideration when conceptualizing and defining design criteria. The users age, computer experience and the purpose for which they entered the museum, will all influence the final outcome. Again as illustrated by "Design a Toothbrush" the decision to make reference to the video arcade culture was related to the ages of the targeted users i.e. young people between the ages of seven and sixteen, who would probably have gained a degree of computer experience at school and

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would be very familiar with computer video games. In a society where young people are becoming increasingly more computer literate, where 30% of primary schools in Ireland have computers and where Nintendo and Sega are common words in a child's vocabulary, it was thought that the computer game concept would be a successful way of engaging the audience and motivating them through the product.

DEVELOPMENT STAGE: DEFINING THE SYSTEM & CHOOSING THE SOFTWARE

The next step is to develop the requirements for the actual software application. With the possible help of a consultant or a computer expert within the team a document can be distributed to vendors inviting them to offer quotes and suggested systems. Sony was a major sponsor of the Design Museum and provided much of the hardware and software for the game. Consequently, in this case, the supplier was predetermined. Also the decision was made earlier in the design process to use computer aided design (CAD) software. CAD emphasises three dimensional modelling and rendering, (providing results that would be visually interesting and attractive to the user), is an important component of many design practices, and is a program with which the public is broadly familiar. However to use CAD directly as it is used in business would be far too difficult a process for a first time user with no previous knowledge of the programme. It would demand patience and experience and would be in direct opposition to the nature of the video game and the user's abilities. As a result the system had to be modified and simplified to guide the user through the stages of the game with maximum speed and a sensitivity to casual use.

By using a large database of solid modelled components, associated analytical data and shaded images that could

The first part of the report is a general
 description of the project. It is followed by
 a detailed description of the work done
 during the last year. The report then
 discusses the results of the work and
 the conclusions drawn from them. Finally,
 the report ends with a list of references
 and a list of figures.

be assembled to form the designed object, it was possible to create the skeleton of the game (Baker, 1991, p. 428).

A videodisc with 54,000 single image capacity on each side, allowing 36 minutes of continuous running time with each frame to be individually identified and accessed almost instantly, was chosen.

Having outlined the basic objectives of the system and selected the software, it is now important to realise, that the way in which items of linear information are connected, is as much a part of the content as the information itself. At this stage a clear understanding of the direction of the project is essential so that all members of the design team can communicate freely over the refinement of the system and to avoid the various traps many designers are susceptible to.

TRAPS TO BE AVOIDED

Designers often tend to see the logic of their own work which to them may make complete sense but to the user, who may only get to spend twenty minutes with it, the system might not be so clear.

Secondly, it is tempting to use every trick the medium allows.

However at the end of the day the best option is

to select the best options from an array of possibilities, to make decisions which show a sensible and attractive consistency, and to keep the design simple and lucid (Yelavich & Hewitt (Eds), 1996, p. 22).

Every idea should be tested against the original concept and any one that does not directly support it should be discarded.

The final trap to avoid is the over complication of the system.

Computers can store and process huge amounts of information and it is tempting at times to try and store and convey as much as possible to the user. However in museum systems, this can sometimes be excessive

for certain applications i.e. information overload can confuse the user to such an extent that they receive too little information about too much and not enough about anything in particular. For example in the Design Museum the CAD system used, only allows the user to make alterations to three parts of the toothbrush: the head, the handle and the shape of the neck. Two head sizes are allowed, as are two handle sizes and four neck shapes. This allows the user sixteen possible models for construction (on a Silicon Graphics workstation using Alias Software). In reality, however, a CAD system facilitates the design of an infinite number of shapes and sizes. However this is a skilled process that cannot be undertaken in thirty minutes (irrelevant of the designers skill and experience). To communicate the objectives of the system this was not necessary and in fact, as mentioned earlier, it would only be in opposition to the game structure and the modified system would be much more appropriate for the selected application.

DEVELOPMENT OF THE HARDWARE

Having completed the software development the hardware must then be approached. Hardware is the delivery system which actually presents the interactive programme, and this stage involves the selection of input and output devices. No single choice is ideally suited to all environments and applications and factors as diverse as designers previous experiences and preferences and the prospects of corporate sponsorship may influence any one choice of hardware. The most common input devices for IV and multimedia systems are the keyboard and the mouse, however a number of other input devices have been developed for professional and consumer markets and the particular demands of public information systems. These vary

The first part of the report
describes the general situation
of the country and the
state of the economy.
It also mentions the
main problems which
the government is facing
at the present time.

CONCLUSION

In conclusion, it can be seen
that the country is in a
state of economic crisis.
The government must take
immediate action to
solve the problems which
are causing this crisis.
The first step should be
to reduce the public
expenditure and to
increase the revenue.
This can be done by
raising the taxes and
by cutting down on the
wages of the public
employees. The second
step should be to
reform the financial
system and to
bring the money market
under control. The
third step should be
to improve the
administration of the
country and to
eliminate the corruption.
Only by taking these
steps can the country
be brought back to
economic stability.

from touch-sensitive screens, keypads and joysticks to light pens and smart cards. Each device carries with it, its own set of advantages and disadvantages, which render one or a combination of a few , better or worse in different situations.

Choosing input and devices and designing a retrieval routine often represent a balance of interests between the demands of an interactive presentation and the abilities of the end user" (Hoffos, 1992, p. 20).

One institution, may even chose different delivery systems to present different programmes, with different input devices and participative systems i.e. perhaps the institution would have touchscreens in the galleries and smart cards for database. On the other hand smaller institutions may favour a single delivery system with the same operating system regardless of where it is used. When choosing between the two the ultimate choice should only be made "after a thorough and candid analysis of both the aims and objectives of the project and visitor profiles of the institution" (Signe Hoffos, 1992, p. 20).

Taking again the example of the Design Museum, careful consideration was taken in the choice of hardware. A natural unintimidating input device was necessary for the success of the game. Due to the age of the targeted audience a keyboard was considered too sophisticated and a touchscreen a more natural interface, activated through pointing and touching. In this case any disadvantages associated with touchscreens were far outweighed by the advantages it awarded to this application.

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HOUSING AND THE CONTROL OF AMBIENT NOISE

The final consideration is the housing of the system, This is a field which excites just as much discussions any other aspect of the specification.

All housings must be secure and tamper-proof, and allow access to equipment for authorised staff, but their shape, size and decoration may vary from a wall panel to a free standing kiosk (Hoffos, 1992, p. 21).

As in the choice of hardware and software the eventual selection must be decided by fitness for purpose. Whether the display system should be free-standing, or built into display units; the height at which the screens or control devices should be placed in the exhibition; whether the system should be portable: these are all questions that need to be answered when designing the housing. The control of ambient noise is also a consideration, as in any public place, even without audio information systems, noise can reach an unacceptable level. Although all visitors are likely to benefit from systems which engage several of the senses at one time, the addition of sound can cause real environmental problems. Listening booths can be an option for people who want to explore at their ease, and although headphones take up less space and do offer some privacy, they discourage any passer by from casually participating in the same presentation.

In the Design Museum the video game is housed in the Upper Gallery. Eight workstations were installed, in a space devoted to the use of technology as a means of providing information about design, the design process and designers. Each of the IV units is mounted on a simple table and players use headphones so that conversations generated by the game are contained (thus reducing the ambient noise).



Fig. 11 “Design a Toothbrush”, Interactive exhibit: The Design Museum, London. Players use headphones so that the conversations by the game are contained.

In the summer of 1990, a year after the Museum opened, Systems Manager Harriet Phillips said that the programme was so popular that 'you'd be lucky to get a seat on most days' (Hoffos, 1992, p. 46).

The museum is unusual in offering seats but this is primarily to encourage longer individual use of the system. Most visitors tend to spend between fifteen and twenty five minutes and some will even try other game strategies by playing the game more than once. Although the seats encourage longer periods of interaction, thus decreasing the number of possible users per minute, the users who do interface with the system learn more about the issues and relationships which inform industrial design. The players are also obliged to view a great deal of supplementary material about the nature of design and the manufacturing process, which warrants the amount of time spent interfacing with the game product.

As can be seen, the design of a multimedia system is a lengthy and complicated procedure. It must be undertaken in a logical and well thought manner. No decision can be made without proper analysis of the available options and constant reference to the original objectives initially set out in the concept stage. As in all things the seriousness with which the procedure is approached is in direct proportion to the short and long term success of the exhibit. As illustrated in "Design a Toothbrush", careful and systematic planning and development leads to the production of a highly successful exhibit which manages to achieve the correct balance between education and entertainment. In an interesting and progressive way the exhibit succeeds in both emphasising the importance of technology in design, and providing the user with a broad insight into the design process. It helps the user to view the objects with a greater insight and hopefully with greater

1. The first part of the paper is devoted to a general

discussion of the problem and the main results.

2. In the second part we consider the case of

the first order linear differential equations.

3. In the third part we consider the case of

the second order linear differential equations.

4. In the fourth part we consider the case of

the third order linear differential equations.

5. In the fifth part we consider the case of

the fourth order linear differential equations.

6. In the sixth part we consider the case of

the fifth order linear differential equations.

7. In the seventh part we consider the case of

the sixth order linear differential equations.

8. In the eighth part we consider the case of

the seventh order linear differential equations.

9. In the ninth part we consider the case of

the eighth order linear differential equations.

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the ninth order linear differential equations.

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the tenth order linear differential equations.

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the thirteenth order linear differential equations.

15. In the fifteenth part we consider the case of

the fourteenth order linear differential equations.

16. In the sixteenth part we consider the case of

the fifteenth order linear differential equations.

appreciation. The user's interest is maintained through the 'game' format, but rather than merely playing mindlessly to beat the money clock the user is interfacing with an information system which guarantees that they will leave with knowledge that they may not previously have possessed.

UNSUCCESSFUL APPLICATIONS OF INTERACTIVE MULTIMEDIA IN THE MUSEUM

However not all applications of multimedia in museums are as successful.

The problems museums are experiencing lie not in computer hardware and software but rather are inherent in the procedures used to initiate and manage projects. Without determining what they want to do or exactly how to do it, museums rush into computerization with a naivete that is startling (M.L., 1994, p. 3).

In the past, many museums have not achieved the computer friendly environment that had come to dominate the commercial world. However, spurred on by the need to justify their existence, define their functions and compete with theme parks and video arcades, much time and energy was spent on feeding information into computers only to discover that retrieving it in usable form often posed unsurmountable problems.

In other words, the organisation and structure that had been lacking in the manual system was not suddenly 'put right' by the simple fact of automation (M.L., 1994, p. 3).

In fact, the introduction of computers in an environment where museum staff did not have any previous technological knowledge, tended to create a negative psychological effect resulting in a reluctance to change working methods and procedures. However, with

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new emphasis on the public dimension, further integration of education, exhibition and interpretation, is imperative.

Another unproductive approach assumed by many museums involved the attempt to do too much at once and to be too much to too many people. "This approach has generally resulted in databases that record a lot of information for a few objects and no information at all for the most" (Spurgeon, 1994, p. 16).

To avoid these mistakes, education of museum staff is important so that they can both assist visitors in the use, of and maximise their output, from interactive systems, and so that the staff themselves can use computers appropriately in the input of information regarding collections, organising the financial affairs of the museum, printing documents etc. Computers and multimedia systems can be very useful in cultural institutions but only in the hands of properly trained staff.

As mentioned earlier, the installation of such systems must be carried out in a logical, well thought manner. Planning is essential to facilitate correct decision making, and if not approached in a thoughtful manner the end result will be a failure and a waste of museum resources.

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Chapter 7

MUSEUMS OF THE FUTURE

CONCERNING



Chapter 7

The combination of multimedia computing and telecommunications will dramatically alter tomorrow's museum environment. Information will be presented to a public that David Bearman describes as not only literate but 'mediate' (Bearman, 1994, p. 38).

Computers are about to transform the very character of museums and revolutionize our means of experiencing culture. At the moment museums only represent a small niche market for computer systems but as technology grows in importance, in both the commercial and entertainment industry, it has a direct effect on museums, which are increasingly realising the scope for computers in publication, design, exhibition, education and business applications.

The museums of the future will have the facilities to install systems which will be more colourful, more user friendly and networked through wireless connections. Staff will become more acquainted with these devices as computer technology continues to infiltrate all aspects of life. All cultural information and documentation will be accessed via a computer terminal and books will remain in storage only at the access of specialist researches. Culture will be expressed in new formats with experience being the main means of communicating history, nature and science. People will be able "to experience the sights, sounds and even the feel of things distant in space" (Bearman, 1994, p.39). In fact, when we look at museums in the next century, we may not be able to see any objects at all. Holographic images may provide flawless reproductions, without risking any damage to exhibits. Entire collections, may be made available, to people everywhere through ever expanding programmes operable at the touch of a button or in response to simple voice commands. Artefacts themselves may be superseded

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by computer generated images and hardcopy reproductions, which will replace the original objects as the museums language of communication.

The traditionalist reader may express some apprehension about such a future, however multimedia has already infiltrated the museum environment and its increased use is foreseeable. The real task for the progressive curator is to use technology as a tool that will benefit the general public and the researcher alike. As awareness of the potential for multimedia grows, museums can be run with increased proficiency and profitability. Curators will have the ability to engage a reluctant public's attention through, greater use of interactivity which will allow the user various degrees of control over their own learning experience. Passive learning experiences may be eliminated as any associations with churches and temples are replaced with those of theme parks and video arcades. Today's preconceptions of the museum as a place of worship, a citadel of treasures, continue to exist. "Sociological surveys indicate that this is still the case and Berger (1972) shows tables where in a survey the majority of people consider an Art Gallery to be more like a church than any other named buildings" (Schofield, 1993, p. 5). More recent studies also highlight associations with things that are dead and to counteract this museums may, in the future, borrow, in ever increasing numbers, techniques used by the popular culture industry to engage and encourage the visitor's participation.

However if entertainment becomes the focus of the museum, with multimedia being used for its own sake, the museum may become yet another experience, a popular alternative to that which it, initially, tried to compete.

Multimedia facilitates the creation of multisensory exhibits and at first glance, the ability to enjoy such all encompassing experiences in the form of museum exhibits, without the aid of artificial stimulants would seem ideal, but at what expense? Will the visitor become an addict to the museum experience, returning to the museum each week for a regular 'cultural' fix? Will education, the primary function of the museum be lost and become the sole property of only a few privileged academics leaving the rest of us floating in our own individual hyper realistic fantasy world? This may seem very extreme but the reality is that life in general is following the path of the theme park and unless technology is used correctly and wisely, culture and personal may be lost, in the pursuit of computer generated experiences.

Education is a primary function of the museum and this must not be neglected. Museums offer us a connection with our past, they offer us an identity in the emerging 'global village', and an understanding of the basic scientific principles on which our existence is founded. They are important institutions in today's society and while their growing acceptance of interactivity as a form of communication, is a positive development, its entertainment elements must not outshine its educational values. Admittedly, computers can and will play an ever increasing role in the museum but their functions must be carefully planned and implemented.

In the Design Museum multimedia is used to the advantage of the public, researchers, management and staff, alike. While the Study Collection database contextualises the objects on display, allowing the user to cross reference designers, designs and movements the interactive exhibit "Design a Toothbrush" aims to engage the visitors

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attention and simultaneously increase awareness of the design process and the role of technology within it. It sufficiently entertains the user to ensure that they enjoy learning about a field that they may not previously have been so aware of. It is the result of a logical and carefully planned design process involving a team of professionals.

On the other hand, "The Earth Galleries" are undeniably an experience, but their true educational value is difficult to assess. On departure, does the visitor feel a sense of excitement and delight; a product of sensory bombardment or do they leave with an increased knowledge or interest in geology?

While education and entertainment do not have to exist exclusive of each other, finding the correct balance requires clear planning and a well defined brief. Multimedia may be the means by which such a balance can be achieved. It must, however, be viewed as a tool and not the ultimate solution.

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