FAMILY AGENDAS AND FAMILY LEARNING IN HANDS-ON MUSEUMS

Thesis submitted for the degree of
Doctor of Philosophy
at the University of Leicester

by

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December 1997

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THEANO MOUSSOURI

Abstract

This thesis explores the family museum experience from the point of view of the family members. When families visit museums they bring with them their own agenda. Analysing the components of the family agenda illuminates the frameworks through which families perceive their museum visit. Hands-on museums (or exhibitions within museums) were chosen as case studies because they provide for family visitors and, thus, they are more likely to satisfy a wider range of family agendas. Indeed, different types of agendas – including agendas for adults, children and an agenda for learning – were considered. Based on the analysis of the data collected in three institutions, a family agenda model was developed. Five factors were identified as determining the family museum agenda: the family profile, socio-cultural patterns, the personal and the social context of the visit and the museum exhibition(s). The interaction of these factors creates the agenda for the visit and also influences the way the visit is perceived and reconstructed by family members. All the members of the family are actively involved in constructing the agenda. The museum agenda can also challenge the family agenda. Hence the family agenda is constructed, negotiated and refined before, during and after the visit itself.

The methodology used to collect data was qualitative in nature and involved observing and interviewing all the family members of 86 groups in three hands-on museums/exhibitions. Children's drawings were also used. The analysis was performed on data collected on site at the following institutions: the Xperiment! Gallery at the Museum of Science and Industry, Manchester; Eureka! the Museum for Children, Halifax; and the Archaeological Resource Centre, York.

Acknowledgements

I am greatly indebted to my supervisor, Dr Eilean Hooper-Greenhill, who supported me both scientifically and emotionally throughout my research. She was always available whenever I needed her help and advise. Through our tutorials and the seminars she organised, I gained a sense of purpose and the strength to carry on with my research. With her experience and knowledge, she helped me develop my ideas and take them a step further each time. I very much appreciate the freedom I was given to explore and try things in different ways. This gave me the opportunity to understand what and why I was doing and make informed decisions about my research.

Financial assistance was provided by the State Scholarships Foundation (IKY) of Greece for three years. Without its support this project would not have been possible.

Quite a number of museum professionals and academics added in this project and offered valuable insight. First of all, I would like to thank the staff in the museums where I carried out the field research. They were all very generous with their time and the resources that they made available to me. At the Museum of Science and Industry in Manchester it was Gaby Porter, Bhagwant Singh, Alison Vincent, Jill Flynn, Julie Earith, Penny Feltam, Elizabeth Oxborrow, Graham Barguss, Rees Jones, Russell Leigh, Mark Shaw and Steve Thompson. At Eureka! it was Sarah Mumford, David Leon, Bruce Durie, Rebeca Lightfoat, Karen Franklin and Simon Craven. Form the Archaeological Resource Centre I would like to thank Andrew Jones, Gwynn Atkins, Mathew Cooper and David Bowes. My thanks also to Ben Gammon, Sharon Macdonald and George Hein for their valuable feedback at different stages of this research. I sincerely appreciate the help of Claire Seymour who did such a great job in editing the final draft of this thesis.

I would like to thank my friends, colleagues and staff members at the Museum Studies Department for providing a stimulating research environment: Hsiao-ying Tseng-chang, Vivien Golding, Paul Martin, Kate Pontin, Aleka Bounia, Maria Mouliou, Ibrahim Yahya, Margarida Faria, John Carter and Mike Bieber. My thanks also go to Madeline Low and Barbara Lloyd for their help and interest throughout my studies in Leicester. I am indebted to Janet Owen for her interest in my research and our thought-provoking discussions.

I would also like to thank all the families who participated in this study and offered their time and thoughts about their museum visit. Without them this research would not have been possible.

Finally, my own intimate environment has helped me in numerous ways and supported me both in good and bad times. My parents, Kostas and Christina, have provided their support and love throughout the completion of this project. It was always comforting to know that they would be there for me. I cannot thank enough my partner, George. He went through all the ups and downs me and my work had and provided the emotional and spiritual guidance during all these years. He was the one who listened carefully to my ideas and saw them develop; who restored my confidence when things were difficult; who motivated me to carry on. For all my family has done for me, I wish to express my gratitude to each of them.

Contents

Acknowledgements ii

Preface xii

1 Understanding families 1

1.1 Introduction . . . 1

1.2 Studying families . . . 1

1.2.1 Sociology and the family . . . 3

1.2.2 Family organisation and structure . . . 5

1.2.3 The marital dyad and child socialisation . . . 7

1.2.4 Grandparent studies . . . 9

1.3 Conclusion . . . 10

2 Family learning in museums 12

2.1 Introduction . . . 12

2.2 Approaches to human development . . . 13

2.2.1 Cognitive development . . . 13

2.2.2 Lifelong learning . . . 18

2.2.3 Summary . . . 19

2.3 The family as educator in the museum . . . 20

2.3.1 Characteristics of a 'typical' family . . . 21

2.3.2 Motivation for visiting . . . 23

2.3.3 How do families behave in museums? . . . 27

2.4 Family visitors' perspective . . . 32

2.5 A working definition of museum learning . . . 33

2.6 Conclusion . . . 35

3 Hands-on museums 37

3.1 Introduction . . . 37

3.2 Growth and philosophy of hands-on museums . . . 37

3.3 Definition and role of hands-on museums . . . 41

3.4 Hands-on museums: three case studies . . . 44

3.4.1 The Museum of Science and Industry in Manchester 45
3.4.2 Eureka! The Museum for Children 49
3.4.3 The Archaeological Resource Centre 53
3.5 Conclusion 57

4 Methodological approach **58**
4.1 Introduction 58
4.2 The nature of qualitative research 58
4.3 What is qualitative research? 59
4.4 Research design 61
4.4.1 Data collection, management and analysis 63
4.5 Choosing the case studies and gaining access 64
4.6 Methods used 65
4.6.1 Family observations 65
4.6.2 Selection of subjects 65
4.6.3 Family interviews 66
4.6.4 Children's drawings 68
4.7 Conclusion 69

5 Case Study I: The MSI **70**
5.1 Introduction 70
5.2 Family profile 71
5.3 Socio-cultural patterns 73
5.3.1 Why visit the MSI? 74
5.3.2 Practical issues 81
5.3.3 Frequency of visiting 82
5.3.4 When was the decision made? 83
5.3.5 Why the Xperiment! Gallery? 83
5.3.6 Visit plans 84
5.4 The context of the visit 88
5.4.1 The personal context 89
5.4.2 The social context 94
5.5 The exhibition 96
5.5.1 Families in Xperiment! 97
5.5.2 The nature of the exhibition 99
5.5.3 Who is the exhibition for? 101
5.5.4 Addressing the personal and social agenda of the visit 102
5.5.5 The exhibition and how it was perceived 106
5.5.6 Ideas about science and technology 119
5.5.7 Ideas about hands-on museums 121

5.6 Conclusion 125

6 Case Study II: Eureka! 128

6.1 Introduction 128
6.2 Family profile 128
6.3 Socio-cultural patterns 130
6.3.1 Why visit a hands-on museum? 131
6.3.2 Cultural itineraries 132
6.3.3 Planning the practical side of the visit 139
6.3.4 Frequency of visiting 141
6.3.5 When was the decision made? 141
6.3.6 Why visit Eureka!? 142
6.3.7 Visit plans 144
6.4 The context of the visit 147
6.4.1 The personal context 147
6.4.2 The social context 153
6.5 The exhibitions 157
6.5.1 Families in Eureka! 158
6.5.2 How were the exhibitions perceived? 160
6.5.3 Social interaction 162
6.5.4 How were the exhibitions read? 163
6.5.5 Ideas about science and technology 171
6.5.6 Ideas about hands-on museums 174
6.6 Conclusion 179

7 Case Study III: The ARC 182

7.1 Introduction 182
7.2 Family profile 182
7.3 Socio-cultural patterns 185
7.3.1 Why visit a hands-on museum? 185
7.3.2 Cultural itineraries 186
7.3.3 Planning the practical side of the visit 194
7.3.4 Frequency of visiting 195
7.3.5 When was the decision made? 195
7.3.6 Why visit the ARC? 196
7.3.7 Visit plans 197
7.4 The context of the visit 200
7.4.1 The personal context 201
7.4.2 The social context 205
7.5 The exhibition 207

7.5.1 Families in the ARC 208
7.5.2 How was the exhibition perceived? 210
7.5.3 Social interaction 211
7.5.4 How was the exhibition read? 214
7.5.5 Ideas about archaeology and history 221
7.5.6 Ideas about hands-on museums 224
7.6 Conclusion 229

8 Discussion and conclusion **232**
8.1 Methods 233
8.2 Family profile 234
8.3 Socio-cultural patterns 235
8.4 The personal and social context of the visit 237
8.5 The exhibitions 239
8.5.1 The subject matter and the communicative approach 244
8.6 Implications and applications 246

Appendices **248**

A Floor plans and photographs **249**

B Observation guidelines **259**

C Observed behaviour **262**

D Questionnaires **267**

Bibliography **270**

List of Tables

4.1 One version of qualitative research. 60
4.2 A descriptive model of qualitative research. 60
4.3 Mason's version of qualitative research. 61

5.1 Gender and number of the adult and young adult family members. 71
5.2 Gender and number of the child family members. 71
5.3 Single adult family groups. 71
5.4 Number of the adult and young adult family visitors by age. 72
5.5 Number of child family visitors by age. 72
5.6 Educational background of the adult and young adult family visitors. 72
5.7 Adult family visitors by socio-economic status. 73
5.8 Frequency of visiting to the MSI in this study. 82
5.9 Time spent in Xperiment! 99

6.1 Gender and number of the adult and young adult family members. 129
6.2 Gender and number of the child family members. 129
6.3 Single adult family groups. 129
6.4 Number of the adult and young adult family visitors by age. 130
6.5 Number of the child family visitor by age. 130
6.6 Educational background of the adult family members. 130
6.7 Adult family visitors by socio-economic status. 131
6.8 Frequency of visit to Eureka! 141
6.9 Time spent in two of the exhibitions. 160

7.1 Gender and number of the adult and young adult family members. 183
7.2 Gender and number of the child family members. 183
7.3 Single adult family groups. 183
7.4 Number of the adult and young adult family visitors by age. 184
7.5 Number of the child family visitors by age. 184
7.6 Educational background of the adult and young adult family visitors. 184
7.7 Adult family visitors by socio-economic status in this study. 185
7.8 Frequency of visit to the ARC. 195

7.9 Time spent in the exhibition. 210

8.1 Cultural itineraries in operation. 236

B.1 Example of family observation sheet (no. 5) from Xperiment! 261

C.1 Observed behaviour in Xperiment! 263
C.2 Observed behaviour in Eureka! 264
C.3 Observed behaviour in the ARC 265
C.4 Observed behaviour: all museums. 266

List of Figures

I. The family museum experience. xiii
II. Factors determining the family museum agenda. xvii

5.1 Drawing of the back-to-front viewer (girl, age 6). 110
5.2 Drawing of the electromagnet (boy, age 7). 111
5.3 Drawing of the waterwheel (boy, age 7). 112
5.4 Drawing of the waterwheel (boy, age 4). 114
5.5 Drawing flowers with laser (girl, age 3). 117
5.6 Descriptions of touching. 121
5.7 Learning outcomes relating to touching. 122

6.1 Drawing of the Yacht (boy, age 4). 166
6.2 Drawing of the yacht (boy, age 6). 167
6.3 Drawing of the hello baby (boy, age 5). 169
6.4 Introducing abstract concepts. 172
6.5 Characteristics of hands-on and hands-off museums. 178

7.1 Drawing of the Roman numbers (girl, age 7). 213
7.2 Drawing of a shoe (boy, age 4). 226
7.3 Characteristics of hands-on and hands-off museums. 228

8.1 Factors determining the family museum agenda. 234

A.1 Xperiment! Gallery floor plan. 251
A.2 Giving instructions for the experiment. 252
A.3 Describing the experiment. 252
A.4 Explaning the experiment. 252
A.5 Uniform font size. 252
A.6 The back-to-front viewer. 252
A.7 The waterwheel. 252
A.8 The electromagnet. 253
A.9 The electrical circuit. 253
A.10 The spin me.. 253

A.11 The percussion pipes. 253
A.12 Eureka! floor plan. 254
A.13 A section of Me and My Body exhibition. 255
A.14 Panel presenting an overview of the section. 255
A.15 An exhibit with its individual title. 255
A.16 Example of label in Eureka!. 255
A.17 A family in the House. 256
A.18 A family in the yacht. 256
A.19 Family members sending a fax. 256
A.20 Visitors in the Shop. 256
A.21 Factory costumes for role play. 256
A.22 Illustration of telphone communication. 256
A.23 The ARC floor plan. 257
A.24 The finds sorting. 258
A.25 The animal bones. 258
A.26 The Roman numbers. 258
A.27 The sieving. 258
A.28 A volunteer during a demonstration at the loom. 258
A.29 A view of the Computer Interpretation (finds recording system). 258

Preface

The museum and the family are social institutions, each providing structure for a particular area of social life, according to an established pattern of social relationships and behaviour. Since this pattern provides the fundamental structure of a museum or a family it explains to some extent why all museums and all families share common elements. However, social institutions are dynamic and variable both within and across societies. Changes in society affect every aspect of social life and at the same time changes in a particular social institution invariably produce changes in others and society at large. Changes that occur within a certain institution also relate to the individual members of the structures. This goes some way towards explaining the great diversity of museums and family forms.

Economic, political, and technological changes have resulted in the rapid evolution of the museum and family structures over the past century. Increasing demands for democratisation of British society as well as changes in the funding policy of museums have resulted in the need to provide for, and attract, larger segments of the public. Reduction in state subsidisation has placed museums in the highly competitive area of the leisure market and has thus created the need to justify, and in some cases, redefine their function both within this market and to the public at large. These changes have caused much conflict within museums themselves, forcing them to reassess their role and their approach towards the communities they serve. Today museums try to be much more inclusive and to meet the needs of, and communicate with, a wider audience. Over the last two decades research concerning museum visitors has focused on identifying who this audience is, what their needs are and how museums can meet them. A few museums have started thinking about how they can involve their public in all phases of the communication process. Evaluation and visitor studies play a central role in this effort.

Families have also been affected by these changes. It is no longer possible to talk about a typical family (regardless of whether there was one once or not). Families are now more diverse than ever. State intervention, changes in the economy and the work place, and technological changes have brought changes in family structure and household composition. New generations have different experiences of growing up and being part of a family than previous generations had. Given that families are among the largest museum audiences, it is evident that any changes they undergo are affecting and will continue to affect museums.

This thesis attempts to understand how families and museums interact and affect each other. The starting-point was the idea (figure I) that what families bring with them to the visit (*family agenda*) and what the museum expects them to do or to gain from the visit(s) (*museum agenda*) influence the visit and the way the visit is perceived and reconstructed by family members. The interaction of the 'family' and the 'museum agenda' create the *family museum experience*. The term 'family[1] agenda' refers to 'a set of desires, needs and expectations for what the visit will hold' (Falk and Dierking 1994:61). The term 'museum agenda' is used in this thesis to refer to a set of messages that the museum expects its visitors to attend and respond to, and the behaviour it expects them to adopt during the visit. The 'museum agenda' also refers to the long term effects that the museum expects the visit(s) to have on family visitors. The study concerns a particular type of museum in terms of their collections, the communication approach they use, the provisions offered to their audiences, how the audiences are perceived and expected to behave. These are the hands-on museums which reflect a modern development in the museum world. The term 'hands-on' is defined in chapter three.

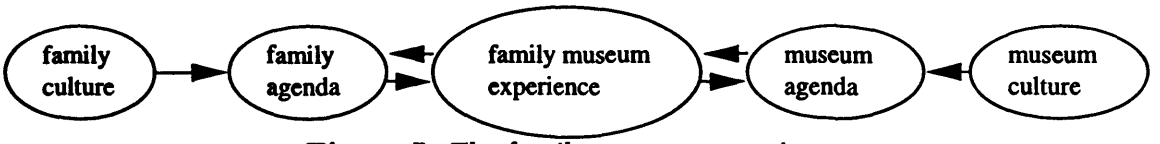


Figure I. *The family museum experience.*

This thesis set out to explore in detail how the family agenda is developed. Of particular interest were the factors that influence its development and how it is manifested during the visit. At a second level it was examined whether there are different agendas between adult and child family members since adults and children occupy different positions and play different roles in the family structure. Socialisation[2] of its members – especially of young children – is among the main functions of the family. Hence, examining whether there is an agenda for learning seems to be relevant to this discussion. Based on this assumption, it was also examined how the family agenda interrelates with the social and physical environment and the agenda of the museum and affects the learning behaviour of the group members. Finally, this thesis explored how the interaction of the family and the museum agenda affect the ways in which family members perceive and reconstruct their visit.

To answer these questions, it was important to acquire background information about the subject studied and to gather data relevant to this area of study. The idea of family agenda created the need to look more closely at families and family life in modern Western

[1]The term 'family' is defined in the first chapter of this thesis.

[2]Defined as education in the broadest sense

societies, in particular. Since families are seen as museum visitors, this thesis examines the profile of family museum visitors in general as well as the profile of the family visitors of the museums used as case studies and those who participated in this research. Other aspects of families as museum visitors reviewed were their motivation for visiting museums and how they behave during the visit. The notion that there could be an agenda for learning as well as different agendas between adults and children drew attention to learning theories and lifelong learning. The need to explore these themes was also supported by the choice of museums. Hands-on museums are designed as informal learning environments. Theories about how people learn have influenced the philosophy, the communication and education policy of these types of museum. Hands-on exhibitions and individual exhibits have specific learning objectives which they try to meet. The relationship between learning theories and exhibition design is discussed (where applicable) in the second chapter of this thesis where learning theories are presented.

The museum agenda is profiled in terms of the distinguishing characteristics and the history of hands-on museums. This discussion was used as the basis for the presentation of the three museums used as case studies. The description of the agenda of these museums was based on the information acquired through the study of their documents and personal communication with museum staff. Hands-on museums or exhibitions within museums were chosen as case studies because they are designed as learning environments for children and their families. Hands-on museums/exhibitions allow for more types of behaviour than traditional museums do. They aim to meet the needs and expectations of their visitors. They are therefore more likely to provide for a range of visitor agendas compared to traditional museums. The choice of the three museums used was determined by the fact that they are Independent (self-governed) museums, they are examples of three different disciplines (science, archaeology and multi-disciplinary children's museum) and they are located in the North of England.

Finally, in order to establish how the interaction of the family and the museum agenda influence the way the family museum visit is perceived, reconstructed and experienced, the research focused mainly on the family agenda – although it did examined how it interacts with the museum agenda. To study this it was necessary to employ a methodology sensitive to the visitor's point of view. To this end, the research approach was qualitative, its main task being to encourage family visitors to describe their expectations and experience in their own terms. To achieve this, it was important to study all family members in each group so that the group would sustain its social nature. Of particular interest were the categories through which family members expressed their expectations and experience of the visit. Families were also observed during their visit.

The theme of this thesis and many of the initial ideas (both theoretical and methodological) came from work carried out by other researchers. The most influential of all was the work of John Falk and Lynn Dierking (1992, 1994) on the museum experience – in

particular the family museum experience – and Sharon Macdonald's study (1992, 1993, 1995) of the Food for Thought exhibition at the Science Museum in London.

This thesis is organised around six main parts which relate to its theme – as discussed above – and the research questions. The first part looks at families as social groups and the family as a social institution. The second part examines the role of the family and the museum in the socialisation of family members as part of modern Western societies (and Britain in particular). The third part discusses the development and nature of hands-on museums in general and the three cases studies in particular. The fourth part presents the methodology employed and the way the data gathered were analysed. The fifth part focuses on 86 families visiting the three hands-on museums (or exhibitions within museums). Finally, the sixth part brings together all the interlinking themes presented in the other sections of this thesis and presents a model which explains how family agenda is developed. The implications and applications of this model in museums is also discussed.

The first part examines families from a historical and sociological perspective. It gives an overview of the field of family studies and, together with the second part, sets the context of this thesis. The discussion refers to families as social groups and to the family as a social institution, and it provides a definition of the term 'family' as used in this thesis. It tries to give an insight into the diversity of family forms in time and across cultures and families, and the variety of ways they have been approached by different researchers. It examines the theoretical and practical questions asked by different frameworks and the ways they are answered. The discussion then turns to the factors which affect family arrangements such as the increase in birth and divorce rates, increase in women in paid work, changes in gender roles; and the factors which influence families and family life such as social class, race and ethnicity. The transition from single-hood to the married state, and child socialisation are also considered. Of particular interest is the role of conversation in constructing (new) identities and a social reality in which family members live. Families are seen as the main locus of child socialisation with the parents playing a central role. Finally, studies related to grandparents are presented. This is quite an important issue for this study. During the design of the study, no distinction was made between adults of different age or position within the family structure. As it was found in the analysis of the data, grandparents' needs, motivation and behaviour are quite different from those of the parents. Just like children, adults are not a homogeneous group.

The second part focuses on learning in general and museum learning in particular. It presents and reflects upon different approaches to human development and what they have to offer to the discussion on how people learn in informal environments. Although adults have different developmental needs, studying child development provides insights into the occurrence of complex developmental processes. Human development and learning become increasingly important in modern societies. Social and demographic changes have created the need for people to be able to adjust and continue to change throughout their life.

They need to be able to direct their own learning activities, while learning should become a lifelong activity. Museums can assist people of all ages to acquire the tools needed to pursue knowledge and can motivate them to learn.

The analysis also refers to how research studies have tried to better understand how learning occurs in the museum as a unique social and physical environment. The emphasis is on family learning. It concerns different approaches used to define families and to understand the family museum experience. To achieve this, researchers have looked at the motivation for visiting and how family groups behave and learn during their visit. The investigation has also looked at how the museum environment – both physical and social – affects the behaviour of the family visitors; and how families' preconceptions and ideas affect their museum experience. The discussion aims to give an overview of the different directions the research on families in museums has followed. Having set the context for the discussion around the family museum experience, it is then shown how this thesis built on previous research on families and museums and what it has to offer to the discussion. This is achieved by highlighting the similarities and differences between previous studies and this thesis. Museum learning is also defined for the purposes of this thesis.

The third part of this thesis is an attempt to give a detailed view of how hands-on museums have developed out of more traditional museums. It also discusses the factors that led to the 'participatory museum movement' in the USA and in Europe; their philosophy and aims; and the criticism concerning the way ideas and concepts are presented through hands-on exhibitions. Three different terms are usually associated with that movement: hands-on, interactive and participatory. Each of them are used to describe different levels of interactivity. However, in this study the term 'hands-on' is used for all exhibits which involve touching. It was felt that it would be an impossible task to distinguish every single exhibit according to the level of interactivity it allows visitors. Yet some distinctions are made, when possible, for groups of exhibits or exhibitions within the museums. Following this general discussion, background on the three case studies is presented. These are the Xperiment! Gallery at the Museum of Science and Industry (MSI) in Manchester; Eureka! the Museum for Children in Halifax; and the Archaeological Resource Centre (ARC) in York. This information includes details on their history, mission, growth, the exhibitions, and any evaluation and research studies carried out by the institutions concerning their public and exhibitions.

The fourth part describes the design of the methodology employed in this thesis. This was based on a review of research methodology and museum evaluation literature and careful consideration of the research aims. The research methods were chosen so as to allow the family visitors to frame the issues involved and to observe their behaviour as it occurred during the visit. The variety of methods used aimed at giving all family members a chance to participate in the conversation in their own way. Hence, children's drawings were used both as a tool of data collection and as a way of letting children 'speak' about

their museum experience in their own language. The nature of the analysis used allows for different levels of investigation. It looks not only for patterns in what families said or did during the visit but also at more individual accounts of their museum experience. Finally, it looks at how families' accounts relate to their demographic characteristics.

The fifth part includes three chapters which present the findings based on the analysis of the family interviews and observations and the children's drawings gathered at the three museums. As was mentioned above, many of the ideas used in this study were based on previous studies of families and family museum visits. However, by analysing and comparing the three case studies, this thesis builds a new framework for understanding how the family agenda develops and influences the museum experience of families. These ideas are discussed in the final part described below.

Five factors were identified as determining the family museum agenda (figure II). The first is the *family profile.* The composition and background of the family groups, as well as the age and gender of the family members give the profile of the family visitors which relates to their choice and motivation for visiting a specific museum. *Socio-cultural patterns* refer to the functions a particular museum is perceived to serve in the social life of the families interviewed. This relates to families' motivation for visiting that museum. The *personal context* of the visit is used here to refer to the expectations of the family members of what the visit will hold. The *social context* refers to the family visitors' concerns about the social aspect of their visit. Finally, the *exhibition* involves the subject matter presented in the museum exhibitions, its physical characteristics and the media of communication used.

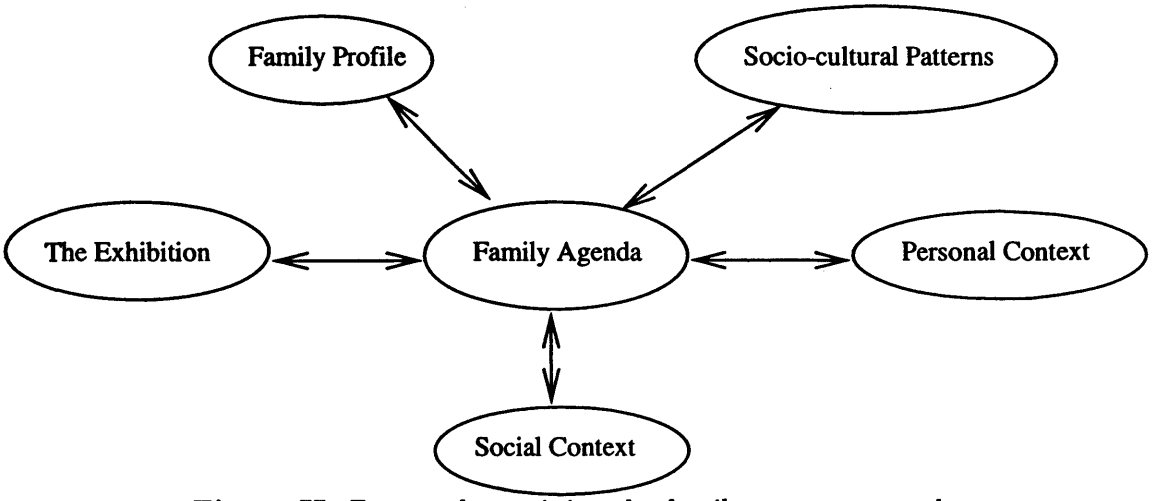


Figure II. *Factors determining the family museum agenda.*

The interaction of these factors creates the agenda for a museum visit but also influences the way the visit is perceived and experienced. All the members of a family are

involved in constructing the agenda of the visit. The family agenda is constructed, negotiated and refined not only during the visit but also before and after the visit itself. It is a dynamic process which is repeated every time families visit museums. There is also evidence that the agenda for the visit is influenced by other leisure activities undertaken by families.

This model can help researchers and museum professionals understand how the family agenda develops and affects the way the museum visit is perceived and experienced and how this affects the visit. It can guide exhibition designers in developing exhibitions and exhibits within exhibitions which would facilitate but also challenge the family agenda. Finally, it can be applied in any hands-on museum/exhibition irrespective of the subject matter covered.

Understanding what families bring with them and how they behave in hands-on museums, forms the basis for effective communication. It can help museum professionals, particularly those concerned with communication, rethink the museum's mission and assess their communication and education approach. To do this, they should study a number of factors related to the family museum visit. First of all, they should recognise that there is a diversity of family forms with different needs and expectations for what their visit will hold. Their motivation for visiting a particular hands-on museum or exhibition is also important. However, the role hands-on museums play in families' social life is the first step toward understanding why they visit this type of museums. Families consist of individual members whose age, position in the family structure, interests and previous experiences determine their personal expectations and concerns about the social aspect of their visit. The communication strategy of the museum should accommodate the expectations and concerns of family members both individually and as a group. Finally, this will create the need for the museum to examine its agenda and compare it with the family agenda in order to identify whether there is a match or a gap between them. Acknowledging and accommodating the family agenda into the design of hands-on exhibitions can engage family visitors in a conversation with the exhibits and amongst themselves. This will enable family visitors to chose what is relevant to them from what is available and determine their own learning experience.

The following chapters will attempt to provide a framework for understanding the family agenda, how it develops and interacts with the agenda of hands-on museums/exhibitions and influences the visit. It will explore the implications these issues have for hands-on museums and provide ideas for practical applications.

Chapter 1

Understanding families

1.1 Introduction

This thesis attempts to explore the family museum experience from the point of view of the family. The focus is on the family agenda: what it entails, how it develops, how it interacts with the museum agenda and what is its effect on the museum visit. Therefore understanding the family itself is of particular relevance here. However, the term 'family' has been used in a multitude of different ways and in different situations. The main objective of this chapter is to explore some of the ways the term is used and perceived and to review current understandings of families and family life.

There seem to be two levels of reality when considering the family. There is the microlevel approach which focuses on the interpersonal relationships of the people who constitute the small group called a family; and the macrolevel approach which examines the family as a social institution. Although both aspects of the family will be considered, a key point in this discussion is 'the distinction between the family as a social institution and families as social groups' (Gelles 1995:20). Further, the family forms a rich domain of social structure as it is involved in the socialisation of its younger members. A section on recent grandparent studies is also included in this discussion. This chapter involves different ways of understanding the family and families as approached mainly by sociologists but also by psychologists, anthropologists and historians.

1.2 Studying families

In studying families, researchers encounter special problems. These are related to the researchers' ability to examine families and to the methodological issues concerned. Personal involvement in families (researchers themselves are born in a family); the private nature of family life; the sanctity of families and family relations; the variation of family organisation over time and across a society; and the changes that have occurred in families (during their life span and in the institution of the family) are barriers which affect researchers'

ability to examine and understand families (Gelles 1995). Family research design and the choice of methods impose yet another problem (Copeland and White 1991). Furthermore, defining the term family is a problem faced by the vast majority of family researchers.

Morgan (1988) considers some 'sets of distinctions' which elaborate some of the meanings which come into play when the term family is used such as ideals/realities[1], family/household[2], nuclear/extended[3], structure and process[4], unity/diversity[5].

In this thesis family is defined 'as a social group and a social institution that possesses an identifiable structure made up of positions (e.g., breadwinner, child rearer, decision maker, nurturer), and interactions among those who occupy the positions. The structure typically carries out specialised functions (for example child rearing), is characterised by biologically and socially defined kinship, and often involves sharing a residence' (Gelles 1995:29). Families as social groups differ from other small groups. These differences are based on the fact that families are 'intimate environments': family members spend time together; they do a wide range of activities; the emotional involvement is quite intense; they have the right to influence each other; there are differences in age and gender of the members, according to the tasks which are assigned; the fact that membership in the case of the children is involuntary; and the knowledge of social biographies (Gelles 1995, Copeland and White 1991). The institution of the family is based on 'a firm foundation of custom and tradition. The basic structure is built with positions and roles' occupied and played in the family by its members (Gelles 1995:20). Both as an institution and as a social group, the family is dynamic and variable. It differs in time, across cultures and across families (Morgan 1988, Reedy and Woodhead 1980, Elliot 1986). Thus, it would be more accurate to talk of 'families' rather than 'the family'. Accepting the concept of 'families', recognises, according to Berger and Berger (in Elliot 1986:5), 'the empirical fact of diversity and reflects a shift in ideological position'.

In spite of their diversity, families seem to have common structures and functions[6]. Another important aspect of families is the conception of the familial or kinship. This refers to relationships based on biological reproduction and blood relationships as well as socially defined relationships[7] (Gelles 1995, Elliot 1986). Family researchers are also faced with a number of theoretical and practical questions, ranging from trying to define a sample to using a framework of understanding family processes. There are a number

[1]This refers to the way family and family life has been idealised in personal, public, media and public discussions. This is actually one of the barriers to understanding families.

[2]Family refers to established relationships through parenthood or marriage, while household refers to 'a group of people sharing the same house'.

[3]Variations in family forms are often obscured by the search for the 'perfect' family form and structure.

[4]One way of considering family processes is in terms of a 'life-cycle'. This way of studying families has been employed by the developmental framework (Morgan 1988).

[5]Some argue that is possible to talk of 'the family' while others argue for a more diverse picture based upon a variety of family forms.

[6]Although certain structures and functions such as residence vary over time and within cultures.

[7]As in the adoptive family.

of conceptual frameworks about marriage and family behaviour. The following section will briefly discuss the major conceptual frameworks used to study marriage and family behaviour.

1.2.1 Sociology and the family

A number of frameworks have been developed and applied to family studies: structural functional, conflict theory, feminist, developmental, symbolic interactional. Similarities and differences have been pointed out between these perspectives. It has also been argued that because they focus on different aspects of the social world and ask different questions they are in some respects complementary (Gelles 1995, Elliot 1986). They appear to be similar in the sense that 'they each see social institutions as interrelated and the family as consonant with and in some measure adapted to other social institutions' and that 'the family is seen as playing a critical role in biological reproduction and in social reproduction' (Elliot 1986:13).

However, their assumptions, frame of reference and accounts of the family's role are distinctively different. The structural functional framework views society as an integrated whole. It sees the family as serving fundamental societal needs of the urban-industrial society since it reproduces members of society and values which are generally shared. A considerable amount of work studied how family members relate to the operation of a family. Universal functions of the family have also been isolated by researchers. This framework has been criticised for providing too static a vision of society and family life unable to deal with social change; for seeing conflict as disfunctional not being part of family relations; and for presenting an outdated notion of male and female roles (Elliot 1986, Gelles 1995).

Conflict theory[8] takes as a starting-point the notion of society as class divided and capitalism as the frame of reference. It, therefore, sees the family as structured by capitalist imperatives. The family is seen as reproducing a labour force for capitalist values and relations. Conflict theorists focus their attention on types of conflicts within families and their consequences, as well as how such conflicts are managed by family members. They, thus, see families as a place of conflict mainly while they do not concern themselves with the role of stability and agreement (Elliot 1986).

The feminist theorists take as a starting-point gender division and patriarchy as a frame of reference. For them, the family is the primary site of patriarchal power and where the patriarchal social order is reproduced. Current approaches have examined gender roles as part of a wider system of male domination by making links between gender roles within families and in other social institutions. They have also been criticised for overemphasising gender conflict in families which are located in a world that is sex-divided and male-dominated (Elliot 1986).

[8]Developed from the thinking and work of Karl Marx.

The symbolic interaction framework is widely used to examine everyday behaviour and interpersonal relationships. By contrast to behavioural psychology models, it sees human behaviour as guided by the meanings that people assign to social situations. Language[9] and interaction play an important role. The focus is 'the meanings that events and things have for individual family members and how these individual meanings are shaped through a process of interaction' (Gelles 1995:50). It has been criticised as being poorly related to wider social processes (Gramling and Forsyth 1987).

The main tasks of those researchers who use the developmental framework are not only to organise families into developmental stages but also to examine the family life cycle by looking at the growth and development of families. At different stages in the life cycle family members face different developmental tasks. Achievement or failure of these tasks is based on interactions between family members and can lead to success in family relations or in failure. The limitations of this framework are that it studies only the 'average' type of family while it cannot always be applied to studying alternative family forms. It has also been criticised as being a descriptive framework (Gelles 1995).

Hence, it is clear that the field of family studies is far from using a unifying approach. Each of the above theoretical frameworks provide the researcher with a way of thinking about and understanding families. Moreover, the frameworks provide them with a range of strategies for testing their assumptions and for developing new propositions. Although family researchers have used many of the techniques available from other fields to study individuals, they have also developed new approaches (Gelles 1995, Copeland and White 1991). One of the main methodological issues researchers have faced is the idea of privacy, as family life was until recently understood to be located in the home. Thus, the household has been seen as the location for discovering the realities of family life while its members have a privileged access to it. Gubrium and Holstein (1987) have reframed the issue from a methodological to an empirical one. According to them (1987:773-4), 'the form and substance of domestic affairs, as known and interpreted by those concerned – be they members or nonmembers – are bound to the social organisation of related descriptive practices[10]. As such, the private realities of the household are embedded and embodied in the public pronouncements, interpretations, and prevailing understandings that serve to articulate them, wherever they occur'. This new viewpoint has opened up new directions for family studies which can now be carried out in diverse settings.

[9]Seen as a tool used by people to develop and modify meaning.

[10]This point relates to studies on how family members construct their social reality carried out within the symbolic interactional framework (section 1.2.3). Similar approaches have also been developed by cultural and educational theories. For a further discussion, see Hooper-Greenhill (1997), Hein (1991).

1.2.2 Family organisation and structure

By examining family structures and forms over time and across cultures, social scientists have been able to distinguish great variety in the social organisation of families. However, there have been many debates among them. The arguments are often based on conventional understanding of families that imply moral or value judgements. Discussing these arguments is beyond the scope of this presentation. The main issues over which there have been long debates include whether changes in subsistence patterns in society have affected family organisations or visa versa; whether there are family universals; whether the dominant household structure that preceded industrialisation was the extended family[11] followed by the nuclear family[12] (Elliot 1986, Morgan 1988, Worsley 1980, Gelles, 1995).

Focusing on modern Western families[13], the debate includes arguments over whether there has been a decline in the family and its functioning ('loss of function') or a specialisation of family functions; and whether the family has become a more isolated institution – 'separate from wider sets of kins, distinct from other institutions in society and functioning as a conjugal or nuclear unit, or [whether] it has become more subject to outside interventions' (Worsley 1980:8). Many of the arguments over modern Western families revolves around issues such as cohabitation and marriage, reproduction, the physical and psychological dependence of the child, the socialisation and the regulation of the relationships between the sexes. The importance of these issues is recognised by all theoretical positions whether they see them as merging to produce 'the nuclear family' or they try to explain how these issues interrelate in producing diverse family forms. Families have also been studied in relation to the wider society in which family members live (Morgan 1988, Elliot 1986, Scott et al 1993/94, Gelles 1995).

Variation in family organisation Some of the sources of variations in which the experience of family life differs are: the sense of family life most people have beyond their immediate household or family, the gender of family members, the social and the ethnic group in which people belong. The wider context in which the family lives enriches the picture even more. Thus, the economy and the wider patterns of work and employment affects the family structure as do the financial and educational status of the parents. Some of the factors which have affected family arrangements are the decline in birth rates in

[11] Where three or more generations share the same household.

[12] Consisting of a husband, wife and their (usually two) children who live in a separate household of their own. The notion that there is a shift from an extended family system to a nuclear one has been much exaggerated (Morgan 1988, Gelles 1995). Moreover, this mode of analysis fails to take account of the array of circumstances and experiences in the modern and the pre-modern (or the pre-industrial) family patterns. The latter argument has been based on findings from cross-cultural research which has 'pointed to variations in family patterns and values between industrial societies – as well as on findings from historical research in Britain, the USA, Japan and elsewhere – which 'suggest that in any given society present-day family patterns and values are continuous with the patterns and values of its past' (Elliot 1986:39).

[13] Which are often assumed to be the nuclear family.

most European countries (with the exception of Ireland) and the disappearance of relatives from home; an increase in the family forms (away from the nuclear family); increase in the divorce rates[14]; the rise in the proportion of women[15] in paid work (especially those with young children); and changes in gender roles and in gender role expectations. According to the 1987 Social Trends, in Britain the percentage of households consisting of a married couple and two children constitute a minority of households (between a quarter and a third) (Morgan 1988, Scott et al 1993/94).

The diversity of family organisations and family values seems to be increasingly acknowledged and accepted by the public. A national opinion poll in 1992 in the USA found a wide variation in what constitutes a family according to the respondents. Although the vast majority of the respondents believed that a married couple with their children constitute a family, one in five identified 'two gay men committed to each other and living together' as a family[16]. Scott et al (1993/94:26) examined international differences in order to determine 'whether there is any supporting evidence for Popenoe's (1988) claim that people increasingly favour individualism and self-fulfilment above family commitment'. The interpretation of the respondents[17] suggested that 'families will become more diverse and that both the normative acceptability and the practice of different family options is likely to continue to grow' (p.45).

In contemporary families social class, race and ethnicity are major social structural forces that influence families and family life. The term social class refers to people who occupy the same layer in the social stratification. There are many variations in measuring social class[18] and different conceptualisations of how many classes exist as well as what characteristics they have. In this thesis, the conceptualisation used – adopted by Dennis Gilbert and Joseph Kahl's (in Gelles 1995) – is one of six social classes. These are the wealthy class, the upper-middle-class, the middle-class, the working class, the working

[14]Many changes that have occurred in the family, such as the fluctuation of divorce, marriage and birth rates, were the result of technological change (e.g. industrialisation, birth control pill), social events (e.g. world wars, immigration) and economic events (e.g. the 1930's depression in the US) (Gelles 1995).

[15]According to Scott et al (1993/94), there has been a steady increase in the proportion of women in paid work in Western Europe and the USA.

[16]The survey was carried out by Roper Organisation (in Gelles 1995) and the percentages reflect responses by Americans: a married couple living with their children (98%); a man and a woman who are married but have no children (87%); a divorced mother living with her children (84%); a divorced father living with his children (80%); a never-married mother living with her children (81%); a never-married father living with his children (73%); a man and a woman who have lived together for a long time and are not married but are raising children (77%); a man and a woman who have lived together for a long time and are not married (53%); two lesbians living together with children they are raising (27%); two gay men committed to each other and living together (20%).

[17]The research was carried out in Britain, the Irish Republic, the USA and West Germany.

[18]According to Gelles (1995:131), 'a society can be stratified along a number of dimensions, including wealth, occupation, education, prestige, power, celebrity, or any other attribute, social or otherwise, that is distributed unequally'.

poor and the underclass. The greatest percentage of the households belong to the upper middle, the middle and the working class (Worsley 1980).

Social class influences the structure of family relationships. The socialisation of the children and their education, the life expectancy and health of family members, gender roles, and the risk of divorce are affected by social class. For example, parents in the upper-middle-class families tend to be much more involved in the daily rearing routines than are parents in wealthy families. In middle-class families the ties with extended kin and relatives are even stronger while family relationships between family members and relatives in the working-class are the centre of their social life. Yet, not every family within the the same social class behaves in the same fashion. Class division has lead to groupings which are determined according to the occupation, income, and education of the 'chief wage earner', assumed to be the man. With more and more women working, this balance has changed and, therefore, the classification of a family into a class system should take into consideration the work, education and income of both partners. Racial and ethnic variations are also elements of family diversity. The structure and life of families from different racial and ethnic groups varies both between them and within the same racial and ethnic group (Gelles 1995, Market Research Society 1991).

1.2.3 The marital dyad and child socialisation

Social class, together with other social factors such as age, education, race, and religion influence mate selection. This choice is also influenced by personality, physical attractiveness, and intellectual ability. The transition from singlehood to the married state has been described by Berger and Kellner[19] (in Gramling and Forsyth 1987) as an on-going process in which the married couple has to construct the reality within which they live. Through a complex set of conversations, interactions, exchanges and negotiations they define marital relationships. It is a process which involves redefining of one's identity. As a result of this process, a set of continually updated norms or rules is developed. The transition to parenthood then adds new members in the family whose role and behaviour needs to be defined. 'As children are born into the family, their place is defined, and behaviours and meanings are redefined, to accommodate the new addition' (Gramling and Forsyth 1987:165). Through this interactional process children develop self-concepts and, thus, are actively involved in the on-going definition of the family and the relationships between family members. Hence, family conversations provide individuals with the power to negotiate their position in the family. However, it is clear that this construction process exists not only within the institutional structure of the family in a given socio-cultural context. These constructions are also determined by the 'social organisation of related descriptive practices'[20] (Gramling and Forsyth 1987, Gubrium and Holstein 1987, Gelles

[19]Their work is based on the symbolic interactionist framework.

[20]As defined by Gubrium and Holstein (1987).

1995).

Family conversations are at the core of the process of both constructing a consensual definition of reality and maintaining the reality of the family. Without them it is impossible to maintain one definition that includes all family members. Gramling and Forsyth (1987) argue that work scheduling, especially alternative work scheduling[21], affects the amount of time family members spend together which provides less opportunities for negotiations.

During the family life span, the parent-child relationships pass through different stages which involve different challenges and transitions. Child socialisation is the part of parent-child relationship which shapes the former's identities, understandings and behaviour. It is a two-way process which takes place throughout one's life. Families play a special role in child socialisation with parents its primary agents. Socialisation is often associated with education in the broadest sense. According to Gelles (1995:290), 'socialisation involves both explicit instruction and unconscious modelling; it influences both personality development and social behaviour'. Modelling or learning by example is considered by Morgan (1988) as more important than deliberate instruction. Central to the discussion of child socialisation is the debate about human nature. This involves two alternative arguments about whether human behaviour is the product of heredity or environment (experience and learning). Today, social scientists and all those who study individual differences are able to study and better understand the interaction between nature and the environment[22].

Much of what appears to be natural progression through a family life cycle is actually the result of state interventions (e.g. the school which has created a minimum period of schooling and a school-leaving age or child benefits). Government policies affect, and will continue to affect, families and family values. Families have also been the focus of wide range of professionals who study and work with families. As mentioned above, social class, race and ethnicity influence child-rearing and socialisation and the experience of motherhood and parenthood (Morgan 1988, Gelles 1995).

Families share the responsibility of child socialisation with other institutions such as the school. There also are free-choice informal learning institutions which families use to socialise their children into the practices of society (such as museums, libraries, and other cultural activities). Research in family studies has examined the factors that influence family leisure time and the way they spend it together. Women's employment, work patterns, housework responsibilities, number and age of the children (if any) affect the availability of leisure time. For example, it has been found that women with young children are much more likely to choose leisure time activities that can be performed at home (e.g. reading, sewing, painting) (Firestone and Shelton 1988). Choosing leisure time activities is also closely associated with the socio-economic, educational, cultural and

[21]This refers to work scheduling other than the 8:00-5:00, five days a week.

[22]Several theoretical perspectives on socialisation are discussed in sections 2.2 and 2.3.

ethnic background of the families[23]. Leisure time has been also considered in relation to marital stability. A relation has been found between shared leisure and marital satisfaction. Limited leisure time interaction and low amounts of shared leisure time have been associated with a greater likelihood of marital disruption, especially for couples with children (Hill, 1988).

1.2.4 Grandparent studies

Family studies have either ignored grandparents or presented them as part of the classical family of Western nostalgia. This is partly due to the fact that only within the last century has increased longevity allowed individuals to be grandparents. According to Gelles (1995:372), the 'rediscovery' of grandparents in the 1980s was a result of 'the new attention focused on the variety of family structures and roles' and 'the increasing proportion of the population that is elderly, and thus grandparents, in society'. Moreover, the standardisation of the life cycle gave people a greater opportunity to maintain kin relationships across generations (Morgan 1988, Elliot 1986).

One of the things that new research on grandparents has indicated is their diversity. There is not a single type of grandparent. Although it is difficult to generalise existing research findings, it seems that there are seven main factors which influence intergenerational contact. These are distance, age of grandparents and of grandchildren[24], gender, marital and employment status of grandparents and prior interpersonal relations with their children. There is some evidence that there is a relation between intergenerational contact and ethnicity, class and race. However, the findings are quite inconsistent (Aldous 1995, Gelles 1995).

A national survey carried out by Cherlin and Furstenberg (in Gelles 1995) in the USA in 1986 distinguished three types of grandparents[25]. The companionate grandparents (55% of the respondents) tend to live close to their grandchildren and have regular contact. They enjoy the relationship with their grandchildren which is characterised by 'closeness', 'affection', 'companionship' and 'play'. However, they rarely assume parental roles or responsibilities[26] such as setting rules or disciplining their grandchildren. The remote grandparents (about 30%) are not intimately involved in the lives of their grandchildren as a result of geographical distance. Finally, the involved grandparents (16%) tend to have regular contact with their grandchildren and to assume parental roles. Involved grandparents are more likely to be grandmothers who assist their children's family in times of crisis (divorced parent, unmarried teenager mother). The same researchers also reported small class and ethnic differences among the Whites but considerable racial differences

[23]This issue will be discussed in section 2.3 with reference to museum visiting.

[24]Older grandparents seem to have less contact with their grandchildren. Similarly grandparents with infant or pre-adolescent grandchildren seemed to have more contact (Aldous 1995).

[25]In total 510 grandparents were surveyed.

[26]They were reluctant to interfere in their children's household (boundary maintenance between families).

among grandparents (in Aldous 1995).

It seems that grandparents get great pleasure from the relationship with their grandchildren. A study (Troll 1983 in Aldous 1995) reported that three-fourths of the respondents see a grandchild at least once a week while younger grandparents are likely to be more involved with them. Studies (Timberlake 1980 and Robertson 1977 in Gelles 1995) with grandmothers reported that they were happy with their relation with their grandchildren as it provides a continuation of themselves. They also agreed that it is easier to be a grandparent than being a parent.

1.3 Conclusion

Based on the starting point and the questions this research set out to explore, it was important to study how families are structured and function in modern Western societies. There are different ways in which families are understood and defined by those who study them. Because of the personal experience that people have as members of a family, the diversity and change in family forms and the idealisation of family form, family researchers face problems in studying families. By using different methodological and theoretical perspectives, they are able to overcome those barriers. Families can be approached on two levels: the microlevel which looks at families as social groups; and the macrolevel which studies the family as a social institution. Both approaches see families and family life as dynamic and variable. They differ in time, across cultures and within families. Family members have different roles based on their position in the family and their interactions.

There are various frameworks that family researchers use to understand and interpret families and family life: structural functional, conflict theory, feminist, developmental, symbolic interactional. They are based on different assumptions, use different concepts and ask different questions according to how they approach marriage and families in their socio-cultural context. They illuminate different aspects of the social world in relation to families. They can, for instance, see the experience of family life in relation to social class, gender, different stages in families' life cycle or to the way social reality is constructed by family members. Much of the discussion, and debate, on families – particularly modern families – refers to their origins, structure and organisation. One of the main results of this discussion is the recognition of the variation in family forms. The diversity of family forms is one of the factors that have affected family arrangements. Other factors include: the increase in birth rates, divorce rates and of women in paid work, changes in gender roles and in gender role expectations, and the disappearance of relatives from home. Social class, race and ethnicity have been mentioned as the major social structural forces that influence families and family life in modern Western societies. This, however, does not mean that every family within a social, racial or ethnic group behaves in the same way.

Family members need to construct new identities and the social reality in which they

live. This is an on-going process which leads to the development of a set of continually updated rules. Family conversations play a central role in the definition and maintenance of those rules and involve all family members. Families are the main locus of child socialisation with parents playing a major role. Socialisation, however, does not only involve children. Instead it takes place throughout one's life. Other loci of socialisation are the school and other cultural institutions – such as museums – where families choose to go in their leisure time.

Most of the studies have focused on marriage and family life as experienced by the marital dyad and their children (when applicable). However, the increased longevity and diversity of family forms, has led researchers to the study of grandparents and intergenerational relationships. What these studies have emphasised is the diversity of grandparents. Distance plays a central role in intergenerational relationships which are the source of great pleasure and satisfaction for grandparents. Other factors have been also associated with frequency of intergenerational relationships such as age and gender of grandparents; age of grandchildren; marital and employment status of grandparents; and their previous relations with their children. It has also been found that intergenerational interaction is likely to be determined by two main norms: boundary maintenance and the feeling of obligation to assist relatives in need.

The above discussion is of great importance and relevance to the study of families in museums. It has defined the term 'family' and highlighted the fact that there is not one type of family. It has also focused attention on the diversity of family forms and of grandparents. Museums have take into account all these family forms. By understanding the structure and function of the different types of families, museums will be able to make informed decisions, and provide for their needs more effectively. There is an obligation and necessity for museums, and in particular for hands-on museums which are visitor-oriented, to be as inclusive as possible.

Chapter 2

Family learning in museums

2.1 Introduction

After the description of the perception of the family and family life in modern Western societies, the discussion now turns to families as museum visitors, focusing on the learning dimension of the family museum visit. Furthermore, learning theories are discussed since they are of particular relevance in the case of hands-on museums. This is due to the fact that the design of hands-on exhibitions and their educational programmes were influenced by such theories.

Museums have increasingly been involved in educating the public through their collections and support material. The educational role of the museum is acknowledged both by museum professionals and by the public. Indeed, museums attract family groups for a variety of reasons. Recently, the family museum experience has been the focus of many studies and discussions. Much of the discussion has evolved around the question of how families learn in museums and what the nature of the family museum learning is. The emphasis has been on the museum's effort to communicate with this specific segment of its public and on the interaction between the members of the family group. In the process of studying family groups who visit museums, different understandings and interpretations of the nature of the family museum experience – and indeed of families as social groups – has been offered.

This chapter will consider different approaches to learning and the family museum experience. The discussion of these issues is based on a review of the literature relating to human development and learning (in particular family learning) from the point of view of psychology, museum education and communication, sociology, visitor studies and cultural studies. The main aim is to contrast the position of this thesis against previous research and to set the context for the analysis of the case studies that will follow. The chapter concludes with a working definition of learning for the purposes of this study.

2.2 Approaches to human development

Although both children and adults have been subject matter for research over the years, children's learning or development has been the focus of most research activity. This has occurred for various reasons. Vasta et al (1992:6) have mentioned some of them: 'childhood is a period of rapid development, early experiences have long-term effects, complex processes are easier to understand as they are forming, knowledge of basic processes can help to solve some of the problems of childhood, and children are inherently interesting'. Research on children's needs and development have been influential in the way museums provide for their young audience.

Although children's development is characterised by rapid change, adults change too through the years. This change refers to their sense of time, their career pattern, their psychological condition and their interests and motivation. A crucial dimension of adult development – which is often neglected – involves 'learning how we are caught in our history and are revealing it. We learn to become critically aware of the cultural and psychological assumptions that influence the way we see ourselves and our relationships and the way we pattern our lives' (Mezirow 1980:270). Adult lives are full of special dilemmas ('life crisis') which cannot be solved by learning more about them or by learning how to cope with them more effectively. 'Resolving these anomalies through critical analysis of the assumptions behind the roles we play, can lead to successive levels of self-development' (Mezirow 1980:271). Museums can engage people in thinking critically about their present position in the world and in dealing with the past. They can help people gain an understanding of themselves in relation to other people and cultures, and a sense of 'human possibilities' (Lumley, 1995).

Although most of the following frameworks on human development have studied behaviour changes for the period that ends with adolescence, they provide insights into complex adult processes. The following discussion will explain human development as seen by two frameworks: behaviourism and cognitive-developmental psychology. Studies from other disciplines will also be referred to where applicable. It will then discuss ideas about life long learning. Reference will be also made to the application of these frameworks in the museum setting.

2.2.1 Cognitive development

Attempts to understand and interpret human development go back in ancient Greece and Rome (Vasta et al 1992:7-10). The origins of modern theoretical frameworks can be traced back to the ideas of the early theorists of the 18th and 19th centuries. Among the first theorists was John Lock (1632-1704). He proposed that a newborn's mind is like a piece of white paper ('tabula rasa') and that knowledge comes to the child only through experience and learning. Due to the emphasis he placed on the individual's experience

and the environmental influences, his ideas are usually referred to as environmentalist. Rousseau's (1712-1778) ideas are at the other extreme claiming that human development is the result of inborn processes. He also believed that 'whatever knowledge the child does not posses innately is acquired gradually from interactions with the environment that are guided by the child's own interests and level of development' (Vasta et al 1992:12). His ideas would today be referred to as nativism.

Some of the early thinkers whose work does not fit neatly into the above frameworks are Pestalozzi, Froebel, Dewey and Montessori. Pestalozzi believed that children have individual interests, needs and rates of learning and that they must be allowed time as well as direct and concrete experience to understand the world around them. Froebel recognised the importance of experience, especially during the early years. He believed that the children's natural interests and motivation should be central to their education. He also favoured children's active involvement. Dewey believed that experience is the best teacher. To him, true understanding results from a mixture of quality of experience and real life situations. Only through experience can the child's environment expand and gain momentum. Montessori's educational approach valued experience as well. The activities that she designed were aimed at children's direct experience with a whole range of materials with the emphasis being on the process rather than the content (Frost and Kinssinger 1976). Her ideas have been used in the design of exhibits for children such as exhibits in The Garden, the under-6s Gallery in the Basement of the Science Museum, London.

Lock's view of human development was used as the basis for the behaviourism approach. With Watson and Skinner as the most influential figures, behavioural psychologists begin with the assumption that much of children's typical behaviour is acquired through conditioning and learning principles. Learnt behaviour[1] is defined as 'a relatively permanent change in behaviour that results from practice or experience' (Vasta et al 1992:35). This distinguishes learnt behaviours from those that are temporary, unobservable or the result of biological processes. Bandura's ideas enriched this model by taking into consideration the social-learning that results from imitating a model. Most of the criticism of behaviourism has been based on its deterministic nature. It sees human behaviour as a mere result of a response to a stimuli or, in the case of Bandura, as the interaction of the individual's characteristics and behaviour, and the environment. However, this model has been widely applied in museum exhibitions and exhibition design by using the exhibit as a stimulus. This led museum professionals to study exhibit effectiveness in terms of its 'power' to attract and hold visitors' attention (Vasta et al 1992, Dierking 1992).

Based on Rousseau's writings, modern cognitive-developmental researchers place a

[1] Four types of conditioning and learning were identified as operating on the child. These move from the simplest to more complex types of learning: habituation, respondent conditioning, operant conditioning, and discrimination learning (Vasta et al 1992:36-40).

great emphasis on environmental influences reflecting the interactionist perspective that is central to all contemporary frameworks. Although this approach encompasses a number of related theories[2] it is often associated with Piaget's work on children's cognitive development. Piaget is one of the most influential figures in psychology. He believed that the child understands the world only by acting upon it. He named the action patterns through which the child understands the world as 'schemas' (cognitive structures). Central to Piaget's theory are the functions of organisation and adaptation (cognitive functions). Organisation is defined as the 'tendency to integrate knowledge into interrelated cognitive structures' and adaptation as 'the tendency to fit with the environment in ways that promote survival' (Vasta et al 1992:30). To Piaget, children are actively involved in creating knowledge rather than passively receiving it from the environment. Adaptation and construction of new knowledge begins at birth and extends throughout life. During this process one can notice major modifications in behaviour which led Piaget to divide development in four qualitatively different stages or periods. These include the sensorimotor (0-2 years of age), the preoperational (2-6), the concrete operations (6-11), and the stage of formal operations (11 years of age to adulthood) (Vasta et al 1992, Dierking 1992, Sund 1976 in American Association of Museums 1992).

Although Piaget's stages of development have been the subject of much criticism, his ideas about the significance of first hand experience with the environment are still very influential. Piaget has influenced the exhibit development process. Major elements of his theory have been applied in the museum space. His idea of learning as an active exchange between the learner and the environment has been applied in participatory exhibits. Science learning environments use his theory of developmental stages when they involve 'various senses and motor skills, present real objects and apparatus and provide opportunities for hands-on exploration of concrete and abstract concepts' (Black 1990:23). Even his concept of developmental sequence is accepted when trying to explain, for example, why many adults are engaged with exhibits originally designed for children (Black 1990).

Howard Gardner (1985, 1988, 1991, 1993) formulated a very inspiring theory of the, so called, 'Multiple Intelligences' (MI) which has been recently widely applied in museums in the United States. His ideas are based on work with normal and gifted children, and with brain damaged patients. According to Gardner (1985:277), MI constitutes 'a positive model of the different intellectual strengths displayed by human beings'. This cognitive study documents that all human beings can approach the world and formulate their understanding of it via the seven human intelligences. There are linguistic, logical-mathematical, spatial, musical, bodily-kinaesthetic, interpersonal and intrapersonal intelligences. Although the development of each of these intelligences differs, every individual should develop each of them to some extent provided that he/she has the opportunity

[2]Cognitive psychology, information-processing models and social cognition.

to do so. The intelligences interact with and build upon each other from the moment of birth. Having also the potential to be involved in symbolic systems invented by cultural environments, these intelligences function together in order to implement complex human activities (Gardner 1985, 1993).

Gardner's ideas have been very influential on both formal and informal education settings. Recently, a number of applied programmes throughout the USA have been based on Gardner's work. These involve all levels of education[3] from preschool to college admission (Gardner 1988, 1993). Responding to an increasing interest from museum professionals, Gardner (1988) has proposed ideas relevant to the museum work and its visitors. These include ways that the content of the exhibitions can foster multiple intelligences; assessing whether the exhibits meet their goals; evaluating what visitors have learnt; doing intensive studies with visitors to explore the nature of their experience; thinking and choosing carefully which intelligence can be used according to the audience and keeping in mind that there are always limits; and that, in order for the museum to be able to represent a wide range of people and intelligences, it should start from inside by representing them in its staff (Gardner 1988).

The other type of cognitive-developmental framework examined here focuses on how social experience[4] affects cognitive development. The most influential theory of social cognition is that of Vygotsky. Vygotsky and other Soviet psychologists believed in the cultural determination of individual development. The surrounding culture teaches children both what and how to think. Children learn through shared problem-solving experiences with someone else, usually an adult. This is referred to as 'social organisation of instruction' or 'socio-instructional process'. Through this process a rich body of knowledge which exists in the culture is transfered to the child. Although this is initiated by the adults, gradually the child becomes responsible for the problem-solving activity and can perform it independently. This process is central to Vygotsky's construction of the 'zone of proximal development[5]'. Vygotsky developed this concept as an alternative to IQ tests which he criticised as being static. He suggested that research should not focus on the child in isolation. He developed two more concepts which refer to what children can do on their own ('level of actual development') and what the child can do with help ('level of potential development') (Black 1990, Vasta et al 1992, Moll 1995). Vygotsky perceived schools[6] as a 'social setting specially designed to modify thinking' (Moll 1995:1).

His work on the role of the child's language in the transition from external to self-control

[3]Project Spectrum is designed to identify and foster multiple intelligences in preschool children and it is based in Boston; student projects for the elementary level were carried out by many schools in the USA; and Arts Propel which is an arts and humanities project in Pittsburgh.

[4]That is knowledge about people and social processes.

[5]'What children can perform collaboratively or with assistance today they can perform independently tomorrow' (Moll 1995:3).

[6]Informal learning settings such as museums can be also seen in the same way.

is of significance to the museum setting. Through social interactions children adopt the regulating speech of adults and internalise it as thought. This pattern is apparent to children between the ages of 4 and 10. Other studies focus on parent-child interaction during problem-solving activities. It has been found that parents' behaviour changes according to each situation. Thus they tend to be more directive with younger children or those who are learning how to perform a new task. As far as children are concerned, there is evidence that they assume the regulating role in guiding their behaviour to solve the problems (Vasta et al 1992). By emphasising the adult-child interaction, many aspects of Vygotsky's work are relevant to family museum visits.

The work of Dewey, Piaget, Vygotsky have challenged traditional ideas about museum learning. The idea 'that learners construct knowledge for themselves – each learner individually (and socially) constructs meaning – as he or she learns' has become increasingly accepted (Hein 1991:89). Museums try to provide people with opportunities for direct interaction with their environment and for constructing their own world. This approach, known as constructivism, is applicable to both formal and informal education. Researchers have tried to apply it in mathematical learning in a classroom setting by using computers (Steffe and Wiegel 1994). The focus of the study was on children's transformation of their cognitive play activity into an independent mathematical activity. The study was based on children's play as much of their reality is constructed through play and it would provide them with the motivation to do mathematics. The activity and instruction were designed so as to provide students with a sense of ownership of the task and plenty of social interactions (with the teacher and other students). This resulted in turning the mathematical activity into mathematical play with social interaction playing a prominent role in this transformation. The constructivist approach has been widely used by George Hein (1991, 1996) as a way of understanding, interpreting and assessing informal learning in museums.

However, cognitive psychology is not the only discipline which looks at how reality is constructed. Similar approaches have been developed by cultural studies, semiotics and human computer interaction. For example, Carey's (in Hooper-Greenhill 1997) approach from a cultural studies perspective views reality as constructed through communication. Symbolic systems not only represent our experience but also shape reality as we perceive it. Hence, 'reality is continually defined and redefined within negotiated frameworks or "interpretive communities"' (Hooper-Greenhill 1997:2). This point relates to Gubrium and Holsteins's (1987) idea of how an understanding and interpretation of the form and substance of family life is constructed and shared by family members and nonmembers. Congreve (1996) used methods developed by cognitive psychology, anthropology and semiotics for computer interface design. She investigated patterns in fine art, video, film, television, graphic design and non visual forms of expression in order to explore any underlying commonalities. Patterns are internal to human's cognitive processes as they give

meaning and can be used for prediction. Patterns can be event predictors and interpreters and also have a time dimension. As people's needs and expectations change over time so does their use of patterns. She (1996), therefore, sees design as becoming a dialogue with the user. Similar ideas have been proposed by Bradburne (1993a) with reference to museum evaluation. He sees evaluation as a tool which can permit visitors to 'actively shape the exhibition' as well as the exhibition experience (Bradburne 1993a:92-93). The above frameworks provide a way of thinking about human development. There are many differences but also overlaps amongst them. All perspectives reflect an increasingly complex approach to their understanding and interpretation of human development. A body of research has been developed which points to the importance of first hand experiences, exploration, prior knowledge, interest and motivation, individual differences and potential, problem-solving, imitation, play, social interaction and culture in learning. This research contributes greatly to understanding museum learning.

2.2.2 Lifelong learning

The term 'lifelong learning' refers to 'a process of learning that continues throughout one's lifetime, based on individual needs, circumstances, interests, and learning skills' (Hiemstra 1981:120). The rapid pace of technological and, therefore, socio-cultural change, the increasing percentage of older people and the availability of leisure time have made lifelong learning not just desirable but necessary nowadays (Hiemstra 1991, Knowles 1991).

Learning takes place everywhere and is a lifelong process. Arguably the most important aspect of lifelong learning is that it is the individual who directs it (self-directed learning). It, therefore, has many implications not only for adult education but also for child education since the acquisition of work habits and the awakening of motivation for self-learning must be shaped in childhood and adolescence (Faure 1972, 1980). Faure (1972:209) argues that 'each individual's aspiration to self-learning must be realized by providing him – not only in school and university but elsewhere too, under conditions and circumstances of all kinds – with the means, tools and incentives for making his personal studies a fruitful activity'. The significance of lifelong learning has been captured in Faure's (1972:13) phrase that 'for the first time in history, education is now engaged in preparing men for a type of society which does not yet exist'. What is really needed to enable people to continue to change throughout their lives in order to respond to the needs of the changing world? What is the role of the museum in such an endeavour and how can it help people meet such an objective?

Knowles (1981:135-136) has proposed a model whose basic concept is that 'every social system – individual, family, neighbourhood, organisation, community, state, nation, world – can be seen as a system of learning resource [...] for individuals to make use of, in a continuing program of self-directed learning projects'. He also sees all agencies in the community, including museums, in an 'integrated holistic relationship' with each other.

He (in Hiemstra 1981) has identified several conditions for adult learning. These can be summarised as follows: the learning process is related to and makes use of the experiences of the learners; learners gain a sense of progress toward their goals; learners feel the need to learn; learners participate actively in the learning process; learners share the responsibility for implementing learning; the learning environment is characterised by physical comfort, mutual trust, and freedom of expression; and learners perceive the goals of a learning experience to be their goals. These conditions seem to be taken into account more and more by museums today as they try to interact with their public at various levels. Hands-on exhibitions and the increasing importance of visitor studies in the development of exhibitions are two signs. Furthermore, some museums in the UK have started involving visitors in exhibition development from early stages (Hooper-Greenhill 1995, Department of National Heritage 1996:166-170). These efforts provide the opportunity for museum professionals and audiences to learn from each other. They also give audiences a chance to represent themselves and their culture in their own ways[7].

2.2.3 Summary

Although a comprehensive definition of learning is not yet available, it has been useful to review some of the ways human learning and development has been approached. Two main frameworks have been identified: behaviourism and cognitive-developmental psychology. Each of them takes different starting points, are based on different assumptions and ask different questions. Both, however, emphasise the need for the individual to have first hand, concrete experiences with the environment in order to construct an understanding of it. Other points have been highlighted above. Montessori emphasised the significance of the process of learning rather than the content or the outcome of learning. Bandura talked about the role of social learning which is achieved by imitating a model. Piaget believed that the learner plays an active role in the learning process. Differences between individuals in their ability to understand the world were the focus of Garder's multiple intelligences. He also stressed the role culture plays in fostering or inhibiting these inborn abilities. Social interactions between adults and children is a central element in Vygotsky's theory as well. Constructivist theories have drawn attention on how individuals construct meaning from their interaction with the environment.

Social and demographic changes have resulted in an increasing need and demand for learning and changing throughout one's life. This involves individuals assuming responsibility and controlling their own learning experiences. To do this, people need to acquire work habits and be motivated to learn from a very young age. In a rapidly changing

[7]For a discussion on how museums can involve visitors in the interest of the main objectives of the museum, see Durrans (1995); see also Csikszentmihalyi (1987, 1995) for a discussion on how visitors' sensory, emotional and intellectual involvement enhances learning and discovery about oneself and making connections with others.

society people need to be able to adjust and continue to change throughout their lives. Museums, together with other cultural institutions, can and should play a key role in helping people in pursuing learning.

2.3 The family as educator in the museum

As has already been noted, families are a very diverse audience. Why do families visit museums? Is learning part of their motivation for visiting? If so, how can diverse groups learn in museums and how can museums enhance family learning and make it meaningful to its members? How can the study of families and human development be used to that direction? Is it possible to measure learning during or after the visit? Answers to these questions are relevant to this thesis as a family agenda for learning is one of the considerations. The following section will explore the ways museums have used studies from other disciplines to understand families' needs. Much of the research carried out in museums has been evaluation studies rather than basic research. Evaluation studies have been criticised for their methodology, 'objectivity' and limited scope. This criticism has opened the way for more theory-driven and qualitative approaches to evaluation. Finally, based on the above accounts of family studies in museums, the following section will describe how this study built upon existing studies, how it differs from them and how it considers museum family learning.

Much visitor research has been carried out over the last few years in an effort to explore different aspects of the family museum experience. According to Minda Borun et al. (1995:262-264), the most basic questions that studies of families in museums have tried to answer are: what characterises a typical family, why do families visit museums, how do families behave and learn in museums and ways of measuring learning. Using this structure as a guide, the following literature review includes some research findings from studies with audiences other than families and settings other than museums. This is especially important for gaining a better insight into subjects such as the motivation for visiting. Moreover, not all research on families falls neatly under one of these categories as they place a great emphasis on learning behaviour. The following section does not aim to be exhaustive. Instead, it provides an overview and highlights some of the directions family research has taken in museums by using examples[8] to make it more concrete.

[8] An effort has been made so that visitor studies carried out in the UK in particular are included. This excludes a lot of studies carried out in other countries and especially in North America where a great number of them have been carried out. However, more examples taken from research studies in museums will be also used along with the presentation of the findings of this thesis.

2.3.1 Characteristics of a 'typical' family

As Borun (1995) notes, there is a bias towards intergenerational family groups in studies on museum visits. There are only a few studies which include couples (married or other) (Hood 1989, McManus 1987, Macdonald 1993), or extended families such as multigenerational families, grandparents visiting with their grandchildren, or other relatives (Rosenfeld 1981). Most of the studies contain families of at least one child and one adult (Diamond 1986, Stevenson 1991, Cone 1978). Families can also be defined in terms of blood relationships and shared residence (Hilke and Balling 1985) or close kinship and shared history (Borun 1996). As Dierking and Falk (1994) comment, ease of data collection is often the reason why many studies focus on a limited number of family members. Data management and analysis can also be a consideration, especially when the investigation includes all family members (as, for example, in this thesis). Yet, how far do these family definitions and typologies go in covering the diversity of family forms?

From what has been mentioned in previous sections, it seems that the experience of growing up in and being a member of a family is different in Britain today from what it was some years ago. According to Skolnick (in Gelles 1995:497), the shift into the "post-industrial" and service economy and the demographic revolution has 'not only created mass longevity but reshaped the individual and family life course, creating life stages and circumstances unknown to earlier generations'. One way of examining family change is by looking at the demographic characteristics of contemporary families.

Between 1981 and 1991 there was a decline in the marriage rate in England and Wales. From 14.2 in 1981, it fell to 12.0 in 1991[9]. For the same period of time, there was an increase in the divorce rates[10] in the same areas: from 11.9 in 1981 it 13.5 in 1991. However, one should also look at remarriage rates which are still quite high although there has been a decline as well. In 1981, the remarriage rate[11] for men in England and Wales was 71.0 while in 1991 it was 46.9. For women living in England and Wales in the same period of time the rates were 23.5 and 18.6 respectively (OPCS, 1991). It, therefore, seems that men are more willing to enter a new marriage after being divorced or widowed than women are.

One reason for this apparent decline in marriage rates is that there is an increased interest among the population in pursuing a higher education degree and a career (Gelles 1995). For example, since 1970 there has been an upward trend in the number of students in higher education in the UK: in 1970/71 the number of students in full-time education was 456,000; in 1980/81 it rose to 535,000 and reached 842,000 by 1991/92 (Davis 1994). Hence, it appears that marriage may be postponed until later.

[9]This refers to marriage rates (persons marrying per 1,000 in the population of all ages), source: Office of Population Censuses and Surveys (OPCS), 1991/FM2 no.19.

[10]Persons divorcing per 1,000 of the married population.

[11]Persons remarrying per 1,000 of the widowed or divorced population.

The rate of cohabitation has also increased (Gelles 1995), representing a stage prior to marriage and a novel way of family life. Although there is an increase in non-traditional family forms (family forms other than nuclear), many of the traditional gender roles remain the same: 'around 90 per cent or more of single-parent families tend to be headed by women, with men remaining relatively distant, or even absent, from the daily demands of child-rearing activities' (Scott et al 1993/94: 24). However, this may be an effect of family laws with reference to child custody for example. According to the same researcher, birth rates in the UK have also reached an all-time low. This is also the case for most European countries (with the exception of Ireland) where fertility rates have dropped below population replacement levels (Scott et al 1993/94).

Gelles (1995) draws attention to some issues related to birth rates. Delays in the first marriage result to delays in having the first child and reduce the likelihood of having a large number of children. At the same time, having children does not always imply a marriage as there are more and more unmarried people with children. There seems to be little evidence that this might change in the near future. In fact, predictions of future trends of age groups of the UK population have estimated that there will be a decrease in the under-16 age group. In 1961 the under-16s constituted 24.9% of the UK population. This percentage in 1991 was down by 4.6% (Davis 1994). A general decline in fertility and birth rates was noticed at the beginning of this century and was only interrupted after the World War II (the "baby boom" of the 1960s) (Gelles 1995, Davis 1994).

Davis (1994) notes that after the 1960s the decrease in population numbers has been progressively lower each decade. Hence, 'the actual number of births each year has remained at around 0.8 million since the mid-1980s, which is expected to fall after 1994 when the large generation born in the 1960s pass their peak child-bearing age' (p.16). It has been predicted[12] that the number of under-16s will fall slightly from the late 1990s until 2011 when the size of this age group will be smaller that it is now[13] (Davis 1994). The same steady decline is estimated for the 16-39 and 40-64 age groups by the year 2031. It is also estimated that then will be a consequent increase in the elderly in the UK population. Hence, for the age group 65-79 the estimated increase from 1991 (12%) to 2031 will be 3.6%. The number of those aged 80 and above is estimated to increase 3.2% during the same period[14].

Museums need to be aware of movements in the age groups as they do (and will continue to) have an impact on the way they operate. Demographic changes may result in existing family research in museums becoming outdated or limited in generalisability. For example, the under-16s and the 16-39 and 40-64 age groups are the largest 'suppliers of visitors' to

[12]Based on Social Trends 24 (1994, in Davis 1994).

[13]The number of under-16s in 1991 was 20.3% and by 2011 it is estimated it will be 19.5% of the UK population while a further decline is expected by the year 2031 (source: Social Trends 24, 1994 in Davis 1994).

[14]In 1991 the proportion of the total population which belonged to the 80+ age group was 3.7%.

museums and the estimated decline of the proportion of the total population belonging to these groups will affect museums in the near future. Other demographic factors which may well affect museums are: the population distribution of ethnic groups[15]; transport and mobility of the population; availability of leisure time and other leisure time choices (Davis 1994).

There is little doubt that families are now more diverse than ever before. Thus speaking about a form of family that is typical across all types of social and ethnic groups is rather difficult. Perhaps the strength of the family as a social institution able to adapt and change can be of great benefit to museums and the change they need to undergo as a response to wider socio-economic and cultural conditions.

2.3.2 Motivation for visiting

Provided that museum visiting is a free choice activity, intrinsic motivation is an important aspect of the activity. Csikszentmihalyi's (1987, Csikszentmihalyi and Hermanson 1995, Csikszentmihalyi and Robinson 1990) work on creativity, the relationship of humans to objects and motivation is of particular importance to museums. Looking at what motivates people to pursue a wide range of activities even in the absence of any extrinsic rewards, he used the term 'flow' to describe 'a state of mind that is spontaneous, almost automatic, like the flow of a strong current' (Csikszentmihalyi and Hermanson 1995:70). This state is characterised by the ability of the individual involved in the activity to 'fully express the self' (differentiation) and 'to feel connected with other entities' (integration). When an individual is in flow, he or she loses the sense of time and the sense of self. Csikszentmihalyi and Hermanson (1995:71) claim that the 'dialectic between integration and differentiation is the process by which we learn'. Thus, the key to flow activities is the growth of the self. He has distinguished four general characteristics of activities that produce flow. These are 'clear goals and appropriate rules', 'immediate and unambiguous feedback' and 'challenges and skills [that] are well matched' (Csikszentmihalyi 1987, Csikszentmihalyi and Hermanson 1995).

Hood is among those who have looked at the reasons families visit museums. She has developed psychographic survey tools in an effort to refine quantitative methods of evaluation (Bicknell and Farmelo 1993). Hood (1989) conducted three studies (Toledo[16], Wahkeena[17] and Indianapolis[18]) using psychographic measures. The analysis of the data

[15]According to OPCS, 1991 (in Davis 1994:19) 'in 1991, 5.5% of the total population belonged to ethnic minority groups'. However, there is a greater variation throughout Britain. For example, ethnic groups in Greater London accounted for 20.2% of the regional population. Further, Asian ethnic groups constitute 50% of the total ethnic population in Britain, with Black categories following (30% of the UK population).

[16]A probability sample of 502 households was used for a 25-minute telephone interview. It included both visitors and non-visitors. Another 69 interviews were conducted at the Toledo Museum of Art.

[17]This was an on-site survey carried out at Wahkeena State Memorial, a nature reserve, and involved a self-administered questionnaire distributed to visitors; 326 questionnaires were completed.

[18]The same method and sampling procedure was used as in the Toledo study; 630 households were

made explicit that 'different types of family groups have different purposes as well as leisure criteria from each other. Usually they try out leisure places where they expect they feel welcome, comfortable and rewarded, and they return to those where their expectations are met and they are satisfied with the total experience' (Hood 1989:168). Families value different criteria[19] in making leisure time choices from those valued by museum programmers and frequent visitors. Thus, family audiences put more emphasis on social interaction, active participation and entertainment than they put on opportunities to learn or do something worthwhile in their leisure time. Among other factors that were reported as determining museum participation were: length of residence in the community where the museum was based; educational and socio-economic background; age of children[20]; and whether the adults of the groups had participated in cultural activities as children (Hood 1989).

Social relaxation was also one of the reasons visitors[21] at the Science Museum in London gave for visiting (McManus 1992). Other reasons included a general interest in science (slightly over one-third), having an enjoyable family outing (one-fifth of the respondents) and entertainment (one-fifth). When asked what they expected to gain from their visit, they specified that they hoped to gain information related to science (more than one-quarter), to satisfy a general interest in the subjects covered by the exhibitions (one-fifth), to see specific exhibits or exhibitions (one-fifth). This means that all of them had learning-related expectations (McManus 1992).

Nick Merriman (1991) conducted a postal survey of 1500 adults in order to collect information on public attitudes to, and attendance at museums and historic sites. The response rate was 66%. He found that people's reasons for visiting vary according to their frequency of visiting[22]. Hence, frequent visitors went to a museum due to a specific interest while regular and occasional visitors visited due to a general interest. All types of visitors mentioned as a motivation to visit a museum, their desire to take others to see it (12%) and sightseeing (12%). Self education was quite low as a motivation among all four types of visitors (1%). Merriman (1991:56) concluded that what was significant was that 'most people who visit museums do so for specific reasons of interest in the individual

involved in this case and the sample included visitors and non-visitors.

[19]It should be noted that these criteria were predetermined. The choices of leisure time attributes families were given include having the opportunity to be with people, to do something worthwhile, to feel comfortable and at ease with one's surroundings, to have a challenge of new experiences, to learn, and to participate actively in leisure events (Hood 1989:153).

[20]This varied among the studies. Hence, in the Toledo study, stages of families' life cycle (families with children under 6, 6 to 11, 12 to 17 years) were a subtle criteria for participation. In the Wahkeena study, parents with older children (12 and above) were more likely to visit a nature reserve. In the Indianapolis study, 65% of those under 35 were very likely to bring children, especially children under age 12.

[21]A hundred visitors were surveyed, a sample representative of the general audience of the Museum.

[22]Four types of visitors were identified: frequent (3 or more visits per year), regular (1 or 2 visits per year), occasional (last visited between 1 and 4 years ago) and rare visitors (last visited 5 or more years ago). A category of non-visitors was also included (Merriman 1991:49).

museums they go to'.

Sharon Macdonald's (1992, 1993, 1995 and Macdonald and Silverstone 1990, 1992) study at the Food for Thought exhibition in the Science Museum, London was in many aspects a pioneering one for the visitor studies field. The study followed the development of the exhibition on a day-to-day basis and involved an examination of visitors' response to it. This was a principally qualitative study which entailed unobtrusively observing visitors' movements and semi-structured family interviews where visitors were encouraged to talk about their experience. In total, 42 completed tracks and interviews were conducted. What is interesting about this study is that 'the methodology was devised around an intention of looking at the kinds of readings of the exhibition which visitors would make' (Macdonald 1992:402).

The study highlighted the ways the Museum visit was appropriated by its visitors and how they were actively engaged in constructing and reconstructing the exhibition. Visitors' motivation for visiting indicated the existence of 'a more general set of cultural projects about museums – about museums' perceived place in social life according to their visitors' (Macdonald 1993:12). This idea has been referred to as 'cultural itineraries' which in the case of the Science Museum seemed, among the visitors to Food for Thought, to be: life cycle, place, family event and education[23]. The educational itinerary was less important among the visitors while family, life-cycle and place seemed to be more dominant. Macdonald (1993:12) claimed that 'for a museum to attract visitors, the more cultural itineraries on which it features – and the higher up on each it is – the better'. Hence, where the itineraries intersect, visitors' motivation for visiting is even stronger. Further, 'the governing itinerary is likely to shape the frequency of visiting' (p. 54).

A three-year study (Linton and Young 1992) involving the Art Gallery of Ontario, the Royal Ontario Museum, the Ontario Science Centre, and the Toronto Metropolitan Zoo collected information on a wide range of issues including visitor motivations for visiting. The study included visitors and non-visitors who took part in three kinds of surveys and interviews[24]. Six factors were studied in relation to visitors' motivation: advance information, special events, the role of the children, location of museum, leisure values, and positive/negative experiences from prior museum visits.

Word-of-mouth information was found to be the most important factor in attracting new visitors and in repeat visitors. Children's age was a source of variation due to the nature of the four museums and the perceived age when children are thought to be able to appreciate the content of a given museum. However, the age of the children[25] was an

[23] A description of these itineraries is provided in the discussion of the data of this study, sections 5.3.1, 6.3.2, 7.3.2.

[24] A base survey carried out with visitors of the museums involved; a non-visitor telephone survey; and six focused discussions with frequent visitors (3 or more visits per year) of all four museums.

[25] According to Linton and Young (1992:251), 'this was based on the level of intellectual and reading skills that families perceived would be required by particular museums'.

important motivational factor for the 18% of visitors who viewed museum visiting as a family or group outing. The way visitors in each museum used their leisure time varied considerably[26]. Visitors to the Art Gallery of Ontario viewed it as a place to visit specific exhibits and used it to 'calm down' and become introspective[27]. Royal Ontario Museum visitors perceived it as a place for 'intellectual stimulation', 'reflection', 'personal growth' and 'recreation'. Frequent visitors to the Ontario Science Centre described it in terms of entertainment, a family event, hands-on, 'intellectually stimulating' and requiring more 'energy' than a visit to the Art Gallery of Ontario, to the Royal Ontario Museum or to the Zoo. Visitors to the Zoo often referred to the 'outdoor physical surroundings', hot weather, and 'social-family opportunities'. Finally, all four museums were associated with positive and negative emotional feelings. During the focus groups, participants indicated that 'support devices' and 'environmental comforts'[28] were factors contributing to satisfaction. This type of information was also communicated to their friends (Linton and Young 1992).

A report (Harland et al 1996), prepared by the National Foundation for Educational Research for the Department of National Heritage, offers a review and critical examination of recent research literature on the role of attitudal factors affecting participation in, and appreciation of the arts; heritage; broadcasting; and sport. Positive motives associated with participation in museums include nine main types: 'general enjoyment'; 'task-oriented skills and a knowledge-seeking attitude'[29]; 'a socialising attitude' which refers to the opportunity of being with family or friends; 'a social pressure attitude' where participation is undertaken to please significant others (i.e when people have visitors); 'a status seeking attitude'[30]; 'a relevance or comfortability attitude' referring to feeling at ease with the content and codes of the cultural activity[31]; 'a self-identity attitude' which is particularly evident among committed arts participants; 'a psychological or therapeutic attitude'[32]; and 'an intrinsic or aesthetic attitude'[33]. The report also refers to some evidence which

[26]Leisure values was one of the factors determining museum visiting in Hood's (1989) study.

[27]Similar to Csikszentmihalyi's idea of differentiation.

[28]This included 'wayfinders, safety, ease of visiting with young children, quiet areas, temperature, humidity, crowd level, and noise level' (Linton and Young 1992:253).

[29]Visitor surveys carried out in the UK within the heritage sector identified several motivations: an interest in the past, 'increasing one's awareness of local heritage and the possibility of researching family backgrounds', acquiring knowledge. Relevant to arts participation is also an interest in self-development which creates a high commitment to arts participation (Harland et al 1996:29-30).

[30]What Bourdieu has described as 'cultural capital' and is closely related to participation in high arts activities by upper and upper-middle-classes. Studies in this country have also found that gaining cultural capital through participating and encouraging children's participation in arts, is a significant motive for attendance in particular among Asians (Harland et al 1996: 35).

[31]This was one of the attributes for participation in Hood's (1989) study.

[32]In the heritage sector, this is related to the 'relaxing' and 'peaceful' location of the museum or site while in the arts the experience appears to be more intense. People have described it in terms of physical sensations or 'thrills' which is closer to Csikszentmihalyi's idea of 'flow' (section 2.5).

[33]It refers to 'participation or consumption undertaken because there is pleasure in appreciating the qualities of the form or the content in a particular sports, arts, or heritage activity' (p. 42). See also

indicated that a positive attitude among people does not necessarily lead to participation.

It is evident that there is a wide range of different reasons why families (or indeed any audience) visit museums. Many of them may well be idiosyncratic but the fact that it it possible to find patterns in visitors' motivation illustrates that museum visiting is determined by wider socio-cultural patterns. This assumption is further supported by the fact that patterns can be distinguished among attitudes to participation in cultural activities in general.

2.3.3 How do families behave in museums?

Maybe the most significant finding which is common in most family research studies is the importance of the social interactions between family members in enhancing learning behaviours. These studies have opened up the way for viewing museum learning as a social rather than as an individual experience. It became evident that family visitors spend a lot of their time interacting with each other or other visitors (Hilke and Balling 1985, Stevenson 1991); and that social interaction is important as a factor contributing to information exchange and retention (Blud 1990, Diamond 1986, McManus 1988, 1992). The importance of sharing the museum experience with other family members was also highlighted by an evaluation study carried out by White and Barry (1986). The study assessed a project for families – known as the HERBlab project – and was conducted at the National Zoological Park in Washington DC. The materials aimed at the variety of ages one might expect in a family group. During the development of the project museum visitors were continually consulted. The feedback was very encouraging since visitors pointed out that they enjoyed the chance they were given to participate, to have a shared family experience and the fact that they had learned something new.

McManus (1988:43) in her study of the social determination of learning-related behaviour in the Natural History Museum, suggested that 'the social aspect of the visits to the museum is not a mere enjoyable overlay adding pleasure to the museum experience for visiting groups. It is, rather, at the core of that experience and a fundamental source of satisfaction in the museum visiting which is brought to the museum'. Another point which McManus and other researchers have made about social interaction is that it fosters communicative situations which are highly desirable since they affect the amount and the quality of information visitors take from exhibits. Family discussions have often been the focus of research on family interactions. In McManus' study the groups containing children tended to 'attend to the exhibit for a long time and [..] talk for a long time about the things they see and do, but the members [are] not likely to read any interpretation about what they see and do in a deliberate, attentive manner' (McManus 1987:268-9). The family 'works together to construct a "family perception" of museum communications, at the same time, each individual forms personal perceptions of the exhibition encounter'

Csikszentmihalyi (1987, 1990, Csikszentmihalyi and Hermanson 1995).

(McManus 1992:176).

Taylor (in Kropf 1992) also looked at family discussions and found that families tended to discuss the exhibits in terms of previous experiences. These discussions 'provide parents with opportunities to reinforce past experience and family history and to develop a shared understanding among the family members' (Kropf 1992:227). Diamond (1986), having studied family behaviour in science museums[34], suggested that exchange of information between the family seems to be a reciprocal activity from which all parties benefit. These 'spontaneous interactions' between family members often result in teaching behaviour. Family members tended to convey different types of information. For example, children tended to share information about the operation and the description of the exhibit and the phenomena being observed. Parents conveyed more symbolic information like information gained from reading labels and exhibit graphics, and information from previous experience (Diamond 1986).

Similar findings were reported by Hilke and Balling (1985 and Hilke 1989). The study involved observing 53 intergenerational groups and took place at a large metropolitan museum of natural history. It included a traditional section (static exhibits) and a hands-on section (allowing for different levels of participation) of the museum. Exhibits were the main focus of the attention with family members pursuing 'an agenda to learn'. Family members employed both personal and co-operative information exchange strategies to facilitate learning. Personal strategies for learning were also employed and were manifested even when family members were with others. Families were also observed to 'create a family interpretation of the exhibit'. The amount of information each family member was exposed to was very much influenced by other family members. A bias in intergenerational interactions was observed where parents strongly preferred children and children preferred adults as interactive partners. It also indicated that teaching behaviour was very subtle and fell within the framework of family interaction. There was no distinction between the two settings in reference to exhibit-related activities and learning-related activities. However, there was a variation in the particular mix of personal and co-operative strategies among family members in the two settings. This was due to the fact that the two settings allowed for different types of exploration. Thus, families in the traditional setting employed a 'move-on-looking' acquisition strategy which allowed them to enhance learning by exploring a greater number of exhibits. They also tended to rely on 'one another for explanations, descriptions, and other interpretive comments about the exhibits' (Hilke 1989:126).

A recent study[35] (Borun 1996), built upon previous studies which focused on physical and verbal family behaviours, and documented the relationship between 'learning levels'

[34]The Exploratorium and the Lawrence Hall of Science.

[35]The following institutions have been involved:The Franklin Institute Science Museum, the New Jersey State Aquarium, the Academy of Natural Sciences, and the Philadelphia Zoological Gardens.

and observable behaviour. It is part of a three-year family learning project whose main aim is to identify and measure family learning. After a preliminary study during which a list of thirteen behavioural categories was identified, 129 families were observed at specific exhibits and their discussions were recorded. Family interviews were then conducted which included a demographic questionnaire. A set of learning levels was developed based on a list of learning goals related to the exhibits. These include: identifying, describing, interpreting and applying. Transcripts of family conversations at the exhibits and during the interview were scored in terms of learning levels. Analysis of the data showed that most families in all four museums fell between the first two learning levels (identifying and describing). Further analysis of the observational data showed that 'the level of learning is related to specific observed behaviour[36]' (Borun 1996:135). This study has also emphasised the significance of the exchange of information between family members on the learning experience of each individual family member.

Discussion with other family members after the visit was also found to be a primary factor in the retention and formation of museum visit memories (Stevenson 1991). Stevenson[37]found that the recall of the visit occurred spontaneously and involved not only information about the exhibits but also how visitors had felt and thought about them. Although the study was followed up several months after the actual visit, the memories were quite vivid. There was evidence that cognitive processing did take place during the visit. However, 'most of the thinking was concerned with "effects" rather than "explanations" or "understandings", although quite often visitors related their experiences to what they knew already or had seen on television' (Stevenson 1991:530).

There is some evidence that the nature of the exhibit influences the amount of social interaction taking place in front of it. Blud (1990) – in her study of families in the Science Museum in London, found the interactive exhibits to be more successful than static exhibits in stimulating a constructive exchange between parent and child. Further, children's understanding of concepts presented by the exhibit appeared to have been aided by the social interaction between parent and child. This happened regardless of the accompanying adult's ability. This finding parallels that of White's (in ASTC 1990:8) who claimed that 'although children frequently initiate exploration of an object, interaction with a family member produces a more sustained inspection'. The significance of interactive exhibits may be best described by Hilke's (1988) findings of strategies for family learning. Thus, one of the most preferred strategies for information pick-up among families is hands-on manipulation.

Besides the type of exhibits, there are other features of the museum environment

[36]The behaviours of the families related to the learning levels were grouped as performance indicators. This helped distinguish between learning levels and provided a measure of exhibit learning.

[37]He carried out his study at Launch Pad in the Science Museum, London. It involved tracking a small number of visitors, using a post-visit questionnaire with 109 groups; sending a follow-up questionnaire a few weeks later; and conducting a follow-up interview about 6 months after the visit.

which can affect families' behaviour. For example, the museum's layout may determine visitors' traffic patterns and, consequently, the exhibits they visit (Taylor in Kropf 1992). The museum environment also seems to influence the appropriateness of the children's behaviour and the need for adults to restrict that behaviour which influences the group's attention to an exhibit (Benton in Kropf 1992). A family's attention to an exhibit can be also influenced by the presence of other visitors (Benton; Taylor; Wolf and Tymitz in Kropf 1992).

In two studies[38] by Falk and others (1991) which took place at the Florida State Museum of Natural History and at the Smithsonian Institution's National Museum of Natural History, it was found that a typical visit to a Natural History Museum consists of four components:

- the orientation period (lasting 3-10 min),
- the intensive looking period (lasting 15-40 min),
- the exhibit cruising period (lasting 20-45 min), and
- the leave taking period (lasting 3-10 min).

These four components were found to vary according to frequency of visiting. Hence, for first-time and occasional visitors the visit included all four components while in the case of the frequent visitor it included two components. Frequent visitors were involved in intensive looking and then they prepared to leave the museum. These studies reveal the importance of exhibit location since exhibits viewed earlier in the visit evoke much more concentrated behaviours than those viewed later (Falk 1991).

In an effort to account for the family museum experience as a whole Falk and Dierking (1992) have developed 'the interactive experience model'. This model takes into account the personal and the social context that visitors bring with them to the museum and the physical context (or characteristics) of the museum environment. The visitor is seen as being actively engaged in the construction and reconstruction of these contexts. The visitor museum experience is perceived as the interaction of the personal, the social and the physical context. Hence, 'whatever the visitor does attend to is filtered through the personal context, mediated by the social context, and embedded within the physical context' (Falk and Dierking 1992:4).

The role of cultural preconceptions in the construction and reconstruction of a museum exhibition was also explored by Macdonald (1992, 1993, 1995). Her study looked at the readings made of the exhibition by visitors themselves. This sensitivity to visitors' accounts was 'essential for finding out how visitors themselves frame the issues involved, and the kinds of language and concepts they use' (Macdonald 1993:53). The ways of seeing

[38]They were observational studies which involved tracking family groups throughout their visit.

or reading an exhibition that visitors bring with them very much determine the messages they take from it. In the case of the Food for Thought exhibition, visitors seemed to read the exhibition through three frameworks: 'culturally dominant ways of categorising the subject matter', 'a typology of exhibition-types derived from previous experience' and 'readings of the exhibition derived from its media and form'. Although these readings were not totally disconnected with the content of the exhibition, they were not the intended messages. Macdonald (1993:55) concluded that 'explicit or intended messages may be ignored or not seen where they are at odds with visitors' cultural preconceptions; the exhibition leaves room for alternative reading'.

In her thesis, Margarida Dias Lima de Faria (1994) discussed museums and visitors as part of a broad process of change which involves the whole social structure. The study looked at the social groups that have used museums, the type of communicational context preferred at different stages and the emotional pattern allowed. The museum has gone through a 'civilising process' with regard to behavioural standards. It has achieved an increased social distinctiveness by adopting and imposing behavioural codes in its interiors. These codes have been transmitted through social contact between different groups and from older generations to younger ones. However, the fact that new groups are entering museums and determining their direction and the weakening of the state monopoly, have allowed less regulated behaviour and more participatory experiences. The child socialisation within the family unit was seen as the means of acquiring civilising behaviours.

Faria observed and analysed family interactions and interviewed[39] families in order to determine how this mediation occurs. She divided families into four categories in relation to different types of parent-child interactions. These were: convivial, role-determined, absent, and authoritarian family. The vast majority of the families were found to be among the first two categories. According to Faria (1994:206), 'a considerable number of these families were investing in their social encounter so as to favour family conviviality – the convivial families – (an attitude more close to postmodern rational); others were using the museum's informative support to communicate with their children by teaching them the exhibition concepts – the role-determined families – (using a museum's modernist discourse responding to modernist aims for personal achievement and for regulation of their children's experience)'. Both types of families described the exhibition as being stimulating, active, closer to "play" and inspiring. Further, the experience was described as educational.

The above examples highlight the fact that the family museum experience has many parameters and can be studied from different perspectives. However, many of these studies are quite narrow in their scope and positivistic in their assumptions. A lot of them focus on what family visitors have learnt from their visit. This excludes the investigation

[39]It was carried out in the Discovering Mammals exhibition in the Natural History Museum, London.

of the other functions museums may serve for their visitors. It is also extremely difficult to compare their results as they often start from different points and make use of various samples and methods. Further, most of these studies are evaluation studies carried out by specific museums, the results of which cannot be generalised and their theoretical background is not clear. In trying to address these problems and stress the need for the establishment of a long-term research agenda on museum learning, a conference was held in Annapolis in 1993. It was organised by Science Learning, inc., with support from the National Science Foundation. Among other issues discussed, conference participants specified a variety of issues involved in conducting long-term research. These are: 'commitment to basic research'; 'conducting long-term research studies'; 'framing studies of museum learning within a larger social, cultural and educational context'; 'making investigations generalisable across a diversity of museum types'; 'developing studies that yield practical applications to present and future museum practice'; and 'ensuring methodological diversity' (Falk et al 1995:32).

2.4 Family visitors' perspective

Although this thesis has been informed by existing studies on families in museums, it differs in many important ways. In terms of the theoretical framework, it has been enriched by the understanding of families offered by sociology, anthropology, psychology and history. Ideas about families and family life have helped to place families in the wider context, instead of viewing them in isolation as most of the studies of families in museums have done[40]. It has also provided an insight into the great diversity of family life forms and into the implications this has for museums. In terms of the methodology used, the approach has been qualitative in nature and sensitive to the family visitors' points of view. One of the main aims of the methodology was to involve all family members and to give them the opportunity to talk about their own experience in their own terms[41]. Instead of imposing a set of categories on visitors' experience, visitors provided their own categories. Although one of the levels of investigation included a family agenda to learn, the scope of the study was not limited to learning[42]. The focus of this thesis was the family agenda and how it affects the family visit from their point of view. It tried to explore the role hands-on museums play in families' social life and how they perceive and make sense of their visit to such a museum. The language and concepts family members used to frame the issues involved was an important element of this research.

Hands-on museums were chosen as case studies as they seemed to be more likely to satisfy a range of family agendas. In particular, three different case studies were used

[40] With the exception of Falk and Dierking (1992), Macdonald (1993) and Faria's (1994) work.

[41] Macdonald's (1993) study is among the few which have actually tried to do that.

[42] The majority of the studies (McManus 1987 and 1988, Hilke and Balling 1985, Blud 1990, Borun 1996) on families behaviour in museums are biased towards learning.

which represent different approaches on hands-on participation and communication. Further, they are examples of different subjects (science, archaeology and multidisciplinary children's museum) among museums. All three of them are situated in the North of England which makes a change since the vast majority of the previous studies were carried out in London[43]. In addition, it is a multi-case study, an important aspect of which is the comparison of the findings in the three museums.

There are some further differences between previous studies and this thesis, in terms of the methods of data collection and the analysis employed. Observations and interviews have been widely used by most visitor studies. However, the family observations in this thesis did not count a limited number of predetermined categories or track visitors around the exhibitions. Family observations were recorded in narrative form on a blank piece of paper and used a general guideline (Appendix B). This allowed the observer to choose any size of family group and to observe all family members at the same time. Further, information on the movements, interactions and reactions of family members could be recorded in relation to their position in the exhibition at any given time during the visit. The family interviews were in-depth and involved all the members of the families. This is actually quite a novel approach since the vast majority of family research in museums has focused on adult family members. It has, however, been used in many sociological and psychological approaches to studying families (Copeland and White 1991:7-27, Gelles 1995:56-69). A further, innovation which this study brings is the use of children's drawing as a tool to gather information. Children's drawings have not received much attention as a research and evaluation method.

The analysis for this thesis allowed for different levels of visitor readings to be included: shared, individual and in accordance with the intended ones or not. Information gathered also related to matters prior to the visit, family members' other interests and cultural activities they pursued, the language and concepts family visitors used. The presentation of the finding is based on the data and combined the family observations and interviews, and the children's drawings.

2.5 A working definition of museum learning

The approaches used to describe and understand learning have both theoretical and practical implications. Hein (1991) suggests that different frameworks can be applied both to learning theory (how people learn) and to epistemology (the nature of knowledge). He points out that 'our epistemological views[44] dictate our pedagogic views' (p.89). Knowledge has been approached in two fundamentally different ways by the main frameworks which study human development: as external or as internal to the learner. A positivistic

[43]See for example, McManus (1987, 1988), Blud (1990) and Faria (1994).

[44]This relates to the way knowledge is considered by different frameworks.

or realistic view of learning has favoured the idea of knowledge as being 'out there', independent of the learner. On the other hand, the 'constructivist' approach to learning sees the learner as actively constructing knowledge through interaction with the social environment. Hence, people are seen as constructing knowledge or meaning both individually and socially (Hein 1991, Hooper-Greenhill 1997). This approach can be related to the idea mentioned above of how families construct their social reality and how this process relates to descriptive practices available to society.

Hence, the approach used and the way terms are defined have methodological and interpretive consequences. This point is very important for this thesis as it focuses on families rather than individuals. Furthermore, it studies families in museum settings which are closer to real-life environments. It should be clear by now that learning, and museum learning in particular, is an interactive process. Further, as was mentioned in previous sections, family members are engaged in constructing their identities and a social reality. This process involves not just the married dyad. It also involves child family members as they grow older. This is an on-going process during which both parts construct a common understanding of the social reality in which they live. Hence, when families come to the museum they have already developed their own agendas which can be as varied as families themselves. The agenda of a family group is seen in this study as being determined by the profile of the family, by the culture in which the family lives and their own understandings of it. On considering a museum visit, the agenda for the visit is further determined by the functions the museum is perceived to play in the social life of the family, personal and social expectations of the family members of what it may hold and by the museum environment[45].

Hence, in order to describe a process which is as complex and continuous as learning, one needs to adopt a definition as broad as possible. Further, the museum setting which provides the context in which learning takes place must be taken into consideration. Finally, in the case of families the nature of the group should be also considered. *Museum learning* is an active process of assimilating and accommodating new information which can be used later. It relates to the *personal context* of the learner and the *social* and *physical context* of the museum environment where learning takes place. *Motivation* plays a central role in museum learning since museums are free-choice environments. When experience is intrinsically rewarding, the visitor is motivated to *explore*. Exploration assists learning, and the acquisition and development of new *skills*. Engaging in intrinsically motivating exhibits or activities involves not only the use of *intellectual* but also *sensory* and *emotional faculties*. Hence, visitors are given the choices and tools to *construct meaning* out of an exhibit/activity and to *construct systems of meaning* (learning how to learn).

This definition of learning therefore emphasises the need for environments where visi-

[45]This includes physical characteristics (such as the museum building), the subject matter and the media of communication.

tors are able to become both physically and intellectually involved in activities which are based on their prior knowledge; which present ideas or concepts in context (as part of the wider socio-cultural context and the visitors' personal experiences); allow for social interaction to take place and time to reflect on the ideas presented and view them from a different perspective; and explore visitor's own perspectives on learning and themselves as learners.

2.6 Conclusion

The literature review presented in this chapter is important for many reasons. It provides an insight into the phenomenon studied and outlines the current status in the field. It identifies the areas where the research gaps are and how they can be best approached. Thus, it relates what has already been researched with what this thesis set out to do. It is, therefore, an essential part in understanding the approach used and will be often referred to throughout the following analysis.

The field studied in relation to families was learning and museum learning in particular. If families use museums as a resource to educate their members (in particular their younger members), hands-on museums – whose development has been influenced by learning theories and are committed to educating their public – should understand families and how they use informal environments for learning. Hence, research carried out on learning at large should be very beneficial for hands-on museums by providing a general framework for thinking about it and how it can be facilitated as a life-long activity.

Research on family museum visits has described family groups in terms of their composition, the type of relationship between family members and their common residence. These approaches, however, do not reflect the diversity of contemporary families. A closer look at the demographic characteristics of the general population in Britain gives a glimpse of the variety of families and family life. Changes in the family as an institution reflect wider social and cultural changes, all of which do affect and will continue to affect museums. The diversity of families relates to the variety of reasons families visit museums. In many studies this has been specified in terms of leisure criteria, according to which people make leisure choices. Intrinsic motivation also plays a significant role and can explain people's reasons for pursuing specific cultural or other activities. Most of the studies have pointed to the visitors' need for social interaction, active participation and entertainment. The importance of education as a reason for visiting varies in those studies. Family visitors have specific or more general interests related to the subject matter of the museum. They often consider the age of the children in their groups. Motivation has been also found to vary according to frequency of visiting and to be determined by wider socio-cultural patterns.

Family visitors' behaviour in museums has also been the focus of much research. Most

of it, however, has emphasised learning behaviour. An important feature of the family visit is the interactions between family members. Social interaction, especially verbal interaction, enhances learning. The exchange between family members, both during and after the visit, is thought to benefit the whole group and help form family memories of it. Family behaviour has also been observed to be affected by the type of exhibits or exhibitions (hands-on or static), the museum environment in general, the layout and by the presence of other visitors. Frequency of visiting seems to affect the nature of the visit. First-time and occasional visitors differ from frequent visitors in their patterns of behaviour during the museum visit. The visitor museum experience is seen as the result of an on-going interaction between the personal and social context of the visitor and the physical context of the museum. The family museum visit is also placed in the wider socio-cultural context. Thus, the role of cultural preconception that visitors bring with them seems to affect the way an exhibition is experienced and constructed by them. Families play a key role in transmitting civilising behaviours, distinct to museums, through the socialisation process. Further, the discussion turned to how this study relates to and differs from previous research of families in museum. This was presented in terms of its theoretical framework, research aims, methodology, choice of methods and the field, and the analysis undertaken.

The definition of learning used in this thesis is based on the discussion of learning theories as well as museum-based research concerning informal family learning. This is characterised by an effort to be as broad as possible.

Chapter 3

Hands-on museums

3.1 Introduction

This thesis investigates the experience of families within hands-on museums. Hands-on museums were chosen to form the site for the research because they provide for family visitors through their exhibitions. They are visitor-oriented environments which are more likely to satisfy a range of family agendas than traditional (hands-off) museums. This chapter will discuss the evolution and mission of hands-on institutions. Examples of some of the most influential museums which were among the pioneers in the 'participatory museum movement' will be given. Although most of them are from the USA and Western Europe – in particular Britain – an effort has been made to locate and include hands-on museums from other countries as well. There is also a bias towards science and technology and children's museums as museums from other disciplines have been more reluctant to follow the 'movement'. A criticism of the hands-on museum will be presented together with how different institutions and museum professionals have responded to the criticism. Furthermore, the terms used to describe this type of museum will be explored and examples of how they are used will be provided. This chapter will also examine the role hands-on museums are called to play and their contribution to informal learning. Finally, it will look at the three museums used as case studies in this thesis in more detail.

3.2 Growth and philosophy of hands-on museums

In the twentieth century, in particular the latter part of the twentieth century, museums have been transformed into places for the education of the public through exhibitions, programmes and support materials. A great emphasis has been placed on creating multi-sensory informal learning environments for their audiences. There has been a shift in the orientation of the museums: from object-oriented to visitor and experience-oriented. Science museums were the first which responded to the need to make the museum experience open to a wide spectrum of the public. Also new types of museums opened, responding

to the needs of specific segments of the public, for example, children's and youth museums. Although the new museums differ from each other in their philosophy and mission, they are all committed to education. Visitors are invited to discover things for themselves through direct experimentation and participation in museum activities.

Since the 1950s a series of events have led to the 'participatory museum movement' which gained momentum in the 1980's in North America and Western Europe (Bradburne 1993a, Hein 1990). However, even before the 1950s, a few museums did encourage active participation on their visitors' part: the Children's Gallery in the South Kensington Science Museum; The Palais de la Decouverte in Paris; the Deutsches Museum in Munich; the Museum of Science and Industry in Chicago; the Franklin Institute Science Museum; and the Brooklyn Children's Museum in New York which was founded as early as 1899 (Hein 1990, Quin 1990, Educational Facilities Laboratories 1975, Danilov 1976). In the early part of the 20th century, museum studies in the USA became concerned with museum visitors, their experience and understanding of the exhibitions, and with the idea of interpretation (Bradburne 1993a).

In the 1960s, these ideas found expression in science centres and children's museums[1] through hands-on exhibitions. These changes in the museum world were not unique to museums. It was part of a broader cultural shift, a demand for participation and access to cultural products by the general population (Bitgood, Serrell and Thompson 1994, Bradburne 1993a). The pressure for museums became stronger as they faced a growing competition from the leisure industry and a lack of resources. There was a demand for museums to reflect and cater for the needs of the general population[2]. The 'participatory museum movement' aimed to bring things out from behind the glass cases to be touched, explored and experimented with. One of the pioneering hands-on museums was the Exploratorium in San Francisco founded by Frank Oppenheimer in 1969. Since then many hands-on museums, such as science centres, children's museums, nature centres and hands-on discovery rooms, opened in different countries all over the world. Even art galleries, history and archaeology museums were influenced by this 'movement'.

The evolution of science centres in the USA and Britain, in particular, was parallel with the movement for the public understanding of science[3]. Raising public awareness of

[1]Edeinken (1992:22) has provided a definition of a children's museum based on the AAM definition of a museum: 'A children's museum is an institution committed to serving the needs and interests of children by providing exhibits and programs which stimulate curiosity and motivate learning. Children's museums are organised and permanent non-profit institutions, essentially educational in purpose, with professional staff, which utilise tangible objects, care for them, and exhibit them to the public on some regular schedule'.

[2]According to Butler (1992), the independent museums established since the 1970s were, initially, those concerned with satisfying their visitors as they paid to enter the museum. However, these museums, with their aggressive market-oriented style, also challenged the approach of museum staff in traditional museums towards the nature of their institutions.

[3]A series of reports, known as Science Indicators, produced by the National Science Board in the USA in the 1970s and the report by the Royal Society in Britain in the 1980s were the key stimulus in the

the contribution of science, technology and engineering, became a major concern of formal and informal educational institutions. A wide range of professional organisations and publications relevant to informal science learning in museums followed. These include organisations such as the Association of Science-Technology Centres (ASTC), the Committee of the Public Understanding of Science (COPUS), the European Collaborative of Science, Industry and Technology Exhibitions (ECSITE); the above organisations have produced many publications often in association with museums such as the Science Museum, London (such as Museums and the Public Understanding of Science which was published in 1992 by the Science Museum and COPUS). In London, a post-graduate course has been created at Imperial College and seminars are held regularly by the Science Museum and the Science Communication course at Imperial College.

In the late 1980s, there was a growing awareness of the importance of education about the past on an international level. Archaeologists started to accept responsibility 'towards the past in all its manifestations and in its relation with the present' (Mackenzie and Stone 1990:5). This new awareness was brought about by a series of events surrounding the 1986 World Archaeological Congress. Since then, there has been an emphasis in the relationship between archaeology and education[4]. Communicating about the past involves choosing what we present, interpret and teach both in schools and museums. In Britain, the Council for British Archaeology (CBA) set up a number of committees to promote archaeology. These included a Schools Committee which was to promote archaeology in schools. CBA has produced a series of publications which provide information, ideas and resources for teaching archaeology[5]. English Heritage (a semi-governmental organisation created in 1984) is also involved in promoting the educational use of historic environments to schools (Mackenzie and Stone 1990, CBA 1995).

The aim of hands-on museums is to introduce children and adults alike to their environment. They try to make the subject of the exhibitions, be it art, science, history or archaeology, accessible and enjoyable to the non-specialist visitor. To achieve this, they use hands-on or interactive displays as a means of communication. The main aim is to show how the content of the exhibits relate to visitors' own lives and the world at large. The interaction is not merely push-button. Exhibits allow visitors to use all their senses, to manipulate, experiment and think. Visitors can control one or more variables in the exhibit and can see what happens as a result. Hands-on museums are places for lifelong

growth of the movement for the public understanding of science in these countries (Briggs 1989, Durant 1993, Miller 1992, Wynne 1992).

[4]According to Mackenzie and Stone (1990:5), 'education is inextricably linked to archaeology because archaeology provides the raw data for the teaching of those subjects concerned with the social world'.

[5]These include a series of booklets which present a number of topics such as Archaeology in the Classroom (CBA 1982a), Archaeology and Science (CBA 1982b). It also includes publications such as British Archaeological News, Young Archaeologist and CBA Briefing which aim to promote research, popular understanding, positive advocacy and effective conservation.

learning. They are visitor-oriented institutions whose main objective is to provide concrete and abstract learning opportunities. Visitors are expected to choose for themselves from amongst the activities and then complete them at their own pace. Visitors are viewed more as active learners than passive receivers of the museum's message. Thus, there is a message of empowerment embedded in the museum's exhibits and activities (Cleaver 1988, Morris 1990, Millard 1994, Parr 1960).

Hands-on museums have become increasingly popular. They attract a large proportion of the public (including people who were not used to visiting the more traditional, hands-off type of museums) who find direct, first-hand experience with the exhibits educational and entertaining. Hands-on museums come in every form and size. There are museums where hands-on exhibitions or exhibits are incorporated into existing exhibitions. This includes traditional science and art museums where hands-on exhibitions were used as a means of interpreting existing static exhibits and/or expanding their visitors' profile and stimulate interest in the rest of the museum[6]. Such exhibitions are the Launch Pad and The Basement in the Science Museum, London; the Earth Galleries at the Natural History Museum in London; Xperiment! in The Museum of Science and Industry in Manchester (section 3.4.1); Light on Science in the Science Museum in Birmingham; the Art on Tyneside[7] display at the Laing Art Gallery in Newcastle upon Tyne; the Microgallery at the National Gallery in London[8]; and the Start exhibition in the Walsall Museum and Art Gallery[9]. There are, also, museums where hands-on exhibits are the single means of communication with the visitors. Such museums are most types of science centres, children's' museums and discovery rooms: the Children's Museum in Boston was one of the first to open (Steuert, Jenness and Jones-Rizzi 1993, Gurian 1981); Eureka! The Museum for Children (section 3.4.2), was the first museum of its kind to have opened in Britain; Techniquest in Cardiff and the Exploratory in Bristol (Gregory 1990, Pizzey 1987) are among the science centres which opened in Britain; and the Parc la Villette, the science centre in Paris (Pizzey 1987:128-161, Thomas 1992:90).

Although most of the latter type of hands-on museums or exhibitions have contemporary interactive exhibits, there are some which include real artifacts which visitors can touch and experiment with. Among them are the Archaeological Resource Centre in York (section 3.4.3); the Discovery Room at the National Museums of Scotland (Stevenson and Bryden 1991); The Children's Museum of Indianapolis in Indiana; and the Discovery Gallery at the Royal Ontario Museum (Freeman 1989).

[6]For more information on the historical development of science museums and centres, in particular, see Butler (1992) and McManus (1992).

[7]For more information on the development of the project and its objectives, see the Department of National Heritage (1996:9-13).

[8]A detailed description of the project, its aims and objectives can be found in the Department of National Heritage (1996:98-102).

[9]Recently Walsall Museum and Art Gallery (1996) has published a booklet which presents the background, the development and design of Start as well as an evaluation report summary.

The success of hands-on museums has been far-reaching. There are, and soon will be, hands-on museums of all sorts in almost all European countries and around the world[10] including: Holland, Sweden, the Czech Republic, Slovakia, Russia, Spain, Italy, Greece, India, Japan, Australia and South America.

3.3 Definition and role of hands-on museums

'Hands-on', 'interactive' and 'participatory' are the terms used to describe the new approach employed by museums to communicate with their public. Although in most cases these terms are used as synonymous they can also be used to convey different meanings. In most studies the terms are used mainly to describe science exhibits or computer displays. The term 'hands-on' seems to be used to describe all situations where visitors can touch an exhibit. This includes the push-button exhibits or those to which a lever is added for the visitor to push or turn. The terms 'interactive' and 'participatory' are usually used to describe situations where the visitor has control or choice over the exhibit. Hence, the idea or concept introduced by the exhibit can be taken a bit further if the visitor chooses.

Lewis (1993), although he accepts that interactive exhibits cover a wide range of different techniques, identifies that there is a common element to all of them: for every action there is a reaction. The Audio Visual Handbook (nd:110) refers to interactivity as 'the process of action and reaction that occurs between user and Delivery Medium via a Graphical User Interface, during use of a Hypermedia programme'. Richard Gregory (1989:1), referring to the characteristics of interactive science exhibits, said that 'the interaction is not merely push-button: it is by individual experimenting with choice and initiative [...] The opening key is curiosity'. Interactive exhibits can, according to Williams (1990), give personal contact since they occupy a small number of visitors. They are also the media of mass communication as the same exhibit can be used by a number of visitors over the years. Eason and Linn (1976) use the term participatory to refer to those exhibits which 'actively involve the visitor in discovering through his own participation in the demonstration process'.

In describing the philosophy of the Exploratorium, Hein (1990:24-25) stated that 'its emphasis [...] was to be interactive – directed to people as thinkers, creators and users rather than as passive consumers. [...] To be interactive the exhibits must be cognitively engaging, not merely physically manipulative. They must invite visitors' questions and then be clearly responsive to the questions put to them. They must be genuinely explorable'. John Stevenson (1991), in comparing Launch Pad with the rest of the Science Museum, concludes that the former shows visitors that they can touch, explore and

[10]For a discussion on the development of hands-on science centres with specific examples see Butler (1992:102-107) and Bradburne (1993a, 1993b). For a similar discussion on the development and spread of children's museums see Lewin (1989).

experiment with everything. To help them do that effectively, there are gallery staff, the 'explainers', whose task is to answer questions, to encourage exploration and even engage visitors in conversation.

Miles and Thomas (1993) state that the term interactivity is used in the Information Technology area with respect to telematic services, to stand-alone devices and to software. They describe the flow of information between the interactive product and the user as two-way since the latter has control over the former. It, hence, has the attributes of a conversation. They go on to identify gradations of interactivity: minimal (e.g. traditional broadcasting media), moderate (e.g. teletext and videotapes), high (e.g. online databases, electronic publications, hypertext and hypermedia 'documents') and higher levels of interactivity. For example, advanced IT systems can be used to generate completely new material in response to inputs.

Beryl Graham (1996), referring to interactive computer-based artworks[11], describes what such exhibits can offer to an audience. They can offer a range of choices and control over the things visitors can do with the exhibit; they are physically and mentally engaging; they can encourage social interaction among the visitors. Interactive exhibits can also be enhanced by what the visitors bring to them. Interactive media art exhibitions are becoming more common in the museum world. Commenting on a recent exhibition – called Mediascape – in the Guggenheim Museum SoHo in New York, Heinrich Klotz (1996:9) said that 'interactivity alters the traditional conception of the artistic image as an object on display'. The image does not need to be contemplated but to be modified; it encourages the visitor to become a player and to enjoy the freedom of 'intellectual and sensual games'.

From the above discussion it seems that the term *hands-on* is used to refer to the mass of the exhibits which can be touched and manipulated[12]. The term *interactive* emphasises the part that the visitor plays with in the process of 'inter-action'. Interactive exhibits are a way of communicating with the museum visitors; not only do they give visitors *physical access* but also *choice* and *control*; they are *mentally engaging*; and there is a two-way flow of information which means that visitors can *participate* in a conversation with the exhibit and other visitors (social interaction). Visitors can *initiate* the exchange of information and *enhance* the exhibit by what they bring to it. Thus, visitors' motivation, initiative, actions, choices, questions and thought enhance the exhibit. However, as was mentioned above (Stevenson 1991), exhibits are only one element of hands-on museums and galleries. There is also the information embodied in the exhibits and the knowledge of the staff working in the galleries[13] (Orna 1993).

[11]This refers to a new interactive art exhibition which was a result of a collaboration between the Barbican Art Gallery in London and the Laing Art Gallery in Newcastle. The exhibition, called Serious Games, used a range of low and high-tech devices to involve visitors in different kinds of interaction.

[12]It also includes static exhibits that can be handled by visitors, push-button, mechanical and computer exhibits.

[13]The most common term used is 'explainers' but also 'enablers' or 'interpreters'. In some institutions,

Although hands-on museums cover a wide range of different disciplines and techniques, they share several characteristics: they are multisensory environments which offer a unique experience for self-directed learning; they emphasise the process of learning, not a specific product[14]; they are informal places where communication is made through interactive three-dimensional exhibits (although they may as well have object-based collections), through written materials and explainers; they are audience and experience-oriented institutions which aim to make the visit enlightening and entertaining for visitors of all ages and forms; they are responsive to the visitors' needs and behaviour; they encourage social interaction between visitors; they are organised according to space, not time; and ideally, they provide information which is linked to real experiences (Chabay 1988, Katz 1965, Pitman-Gelles 1981, Waterfal and Grusin 1989, Wellington 1990).

In this thesis the term hands-on is used as defined above to describe the mass of museums, exhibitions and exhibits where visitors are allowed to touch. This decision is made for the practical reason that the museums described below display a wide range of exhibits[15] and it would be difficult to identify the level of interactivity for every single exhibit. Although terminology is quite important and a description of the techniques employed by the exhibitions will be provided for the reader, the aim here is not to make distinctions between different types of exhibits. The aim is to explore how the family agenda develops and how it interacts with the museum agenda – hands-on museum agenda in the case of this thesis – and affects the family museum visit.

Hands-on museums have been criticised for developing exhibitions where ideas and concepts are presented out-of-context. This has been the case for science centres in particular where science and technology are presented in the form of decontextualised isolated displays. However, the following discussion is relevant to all hands-on museums or exhibitions within museums because of the way knowledge is presented and the power of that knowledge.

According to Butler (1992:114), 'scientific knowledge can never be context-independent, but is embedded in the religious, political, and economic mores of the people who produced it'. Science museums should, thus, consider carefully how this aspect of scientific knowledge is presented. Science centres in particular 'do not make clear [...] that the demonstrations they present to the public are part of an existing knowledge system. There is a danger that science is presented as simplistic truth, a mirror image of a "real" physical world' (Butler 1992:113). If scientific knowledge is presented as objective and authoritative

they are paid full-time or part-time staff. They can also be volunteers: students on work placement, high school students (for example the explainer program of high school students in Exploratorium) (Hein 1990:139) or senior citizens.

[14]Hands-on exhibits present ideas and concepts. There is not a single interpretation of an exhibit. Visitors are invited to construct their own meaning.

[15]From bush-button to interactive exhibits of different levels of interactivity, to exhibits which encourage role-play, and to static exhibits.

through the exhibitions, then 'the message sent to the public by the museum professional is that only scientists can define the subject matter of science' (Bradburne 1993a:91). Such exhibitions, however, miss the opportunity to involve their visitors in public debate (Butler 1992, Bradburne 1993a, Levy-Leblond 1992a, 1992b).

There is a further danger for hands-on science centres in creating 'universal' hands-on exhibits, based on the assumption that scientific knowledge is universal. This approach 'weakens the demand for science exhibitions that respond to a variety of needs and learning traditions [...]' and it is 'a form of scientific imperialism' (Bradburne 1993a).

Like scientific knowledge, the museum experience is a social experience. The museum environment is where the visitor, the scientist and the museum specialist (the curator or the designer) come together and interact. Thus, science cannot be communicated without reference to the visitors who are the receivers of the museum's messages. Part of the debate in the movement of the public understanding of science involves the question of how science communicators see their public. In many cases, the latter are treated like empty vessels to be filled[16]. However, several factors such as age, gender, background and knowledge from everyday experience may well 'filter' the information visitors receive from museums (Bradburne 1993a, Fayard 1992).

Hands-on museums should allow visitors to have control over their own learning experience. Exhibitions should be relevant to the experience of the visitors. To achieve this, exhibits and support material should encourage real interaction by allowing visitors to ask and answer their own questions and by creating new understanding (Butler 1992, Bradburne 1993a, Hein 1990).

3.4 Hands-on museums: three case studies

The institutions which constitute the following case studies are Independent (self-governed) museums with strong links with the locality they serve. They cover three different disciplines: science and technology, archaeology and multi-disciplinary children's museums[17].

The Museum of Science and Industry (MSI) in Manchester is the museum of an industrial city which functions both as a present-day resource and as a means of presenting the city's past. Like most science museums, it is a place where science and technology is exhibited together with the way people have viewed the world throughout the years. The gallery used for the field research was Xperiment! which is a hands-on exhibition.

Eureka! the Museum for Children was built in Halifax in order to meet the needs of the people in the North. It is the first and only Children's Museum in the UK. Eureka!,

[16]However, a study carried out by Wynne (in Bradburne, 1993a:90) with sheep farmers who had to close some farms after the Chernobyl nuclear accident found that the farmers 'had integrated the information they received from the experts with the information that they saw to be true from their experience of the world'.

[17]These are museums which serve children and their families, and people who work with children.

along with the rest of the children's museums around the world, embodies the advance of educational ideas. It aims to give children a place in an adult world.

The Archaeological Resource Centre (ARC) in York reflects the past of this historical city. It is an example of heritage representation which uses an innovative approach to interpretation. It gives its visitors the opportunity to be involved in the process of archaeological research.

The following sections will present the history and the development the above institutions based on the review of the literature (both published papers and unpublished internal documents) and on personal communication with staff of the three institutions.

3.4.1 The Museum of Science and Industry in Manchester

History and development The MSI is housed in the world's oldest passenger railway station. It was founded in 1983 and is part of the Castlefield Urban Heritage Park[18] which is one of the urban renewal programmes developed in Britain during the 1980's. Originally, the Museum was part of the Department of History of Science and Technology, UMIST (University of Manchester Institute of Science and Technology), during the late 1960s. The Museum was then transfered to the Liverpool Road Station[19], becoming the Greater Manchester Museum of Science and Industry. Today all the buildings which formed the original station complex have been restored and exhibitions have continued to open while plans for new ones have been developed. The Air and Space Museum is also part of the MSI building complex (Butler 1992, Greene and Porter 1992, Greene 1996).

The Museum's activities, including the plans for expansion, are informed by the Museum's mission statement which reflects a commitment to the Museum's audience:

> The Museum of Science and Industry will use its remarkable site, the world's oldest railway station, and its collections to create a museum of international standing which has as its theme the industrial city, thereby capitalising on Manchester's unique past, contributing towards its future prosperity and fostering the pleasure of understanding for a broad public (Greene 1996:6).

It is not like a conventional museum in terms of its building and its orientation. Its strategy is to place science and technology in their social context. The latter point is justified by the fact that 'Manchester is a city where the roles played by science and scientists have historically been enmeshed in the industrial, social and political life' (Green and

[18]The area has undergone a great transformation since the opening and the success of the Museum. It includes the area of historic canals, hotels, pubs, offices, houses, a recording studio, art galleries, Granada Studio Tours and an arena for open-air events (Butler 1992, Greene 1996).

[19]Which had been restored by the Greater Manchester Council (GMC) with the intention to provide a home for a museum of science and industry. A charitable trust was established which allowed bodies such as UMIST to remain involved with the project. However, the financial responsibility was passed on to the GMC (Butler 1992).

Porter 1992:94). The Museum therefore tries to function both as a present-day resource by contributing to and drawing upon this tradition and to reflect aspects of its visitors' life (Greene and Porter 1992).

The MSI in Manchester has won many awards and attracts many visitors each year. In 1987-88, it attracted approximately 280,000 visitors while current figures go up to 350,000 visitors per year. (Butler 1992, Porter 1996).

Galleries, themes and interpretation Science is only one element in the displays and activities which usually present an integrated account where science is represented 'as a set of practices and institutions' (Greene and Porter 1992:94). Some of the themes explored through the exhibitions are: steam locomotives, the history of gas, water supply, the development of electricity and its effect on our everyday lives, nuclear power and renewable forms of energy, the development of the printing press and of the textile industry, air and space. Visitors also have the opportunity to watch work in progress in the Museum's restoration workshop and in its Design Department. The Museum's Library and Resource Centre contains a collection of business archives. There is also a reference library which covers a wide range of subjects such as public health and housing, local history, archaeology, politics.

Originally the Museum's education service was provided by Manchester City Education Authority but is now supported by the Museum. The Education Service provides a varied programme of classes for school parties and organises special events for children and their families during holiday periods. Recently a collaboration between the marketing, curatorial and education staff has resulted in a series of science shows and other activities for the visitors (Greene and Porter 1992, 11/1994 pers. com.). These will 'be developed into a broader programme of events and workshops, linked to themes in temporary exhibitions, permanent displays and collections' (Greene and Porter 1992:95).

The Museum uses interactive exhibits to aid visitors in interpreting its collections and to demonstrate scientific principles. Interactive exhibits are spread out throughout the exhibitions but in the Xperiment! Gallery – the Museum's science centre – they are the dominant mode of interpretation. The exhibits cover two main areas: energy and light (Greene and Porter 1992, Porter 1996).

Each exhibit is accompanied by a label which explains how one should use the exhibit and, in some cases, the phenomenon or principle underlying it. Both exhibits and interpretive material are targeted at 7 year olds and above. The Gallery also aims to attract visitors of all ages and educational background. There is an area for under 5's offering a limited number of activities. The Gallery staff spend part of their time explaining the exhibits to school parties and part of it designing, building and maintaining the exhibits. This approach has proven to be ideal for direct evaluation of the exhibits and for the incorporation of visitors' responses in the design and construction process (Butler 1992,

Greene and Porter 1992).

The Xperiment! Gallery was developed in 1988 in order to make connections with the everyday life experience of visitors; to illustrate ideas existing in other exhibits; and to bring more 'science' in the Museum. Visitors in Xperiment! are expected to 'learn scientific principles through hands-on experimentation, backed up by the explainers' (Greene and Porter 1992:94). The original idea was launched in June 1985 when the Museum approached a number of organisations and committees seeking financial support. No systematic evaluation work was done during the development phase but the Museum consulted educational research groups and direct observations were conducted to monitor the effectiveness of the exhibits. Some evaluation was done by undergraduates from the Centre for Environmental Interpretation, Manchester Metropolitan University, in partial fulfilment of their course requirements (Butler 1992, Greene 1989, internal document 1986).

The exhibits produced were developed either by the project team and built in the Museum's workshop or they were based on designs from other science centres such as the Exploratorium and Launch Pad. An exhibit developer and an educational technologist were appointed to develop in-house exhibits and several individuals acted as external consultants. The progress of the project was monitored within the Museum by a team drawn from the departments directly involved in the project (Butler 1992, Greene 1989).

Visitor studies The Museum has conducted evaluation studies in some of its galleries in order to determine the effectiveness of exhibitions; to evaluate proposed ideas for new exhibitions and display styles; to re-display galleries; to monitor changes in public awareness of the Museum; and to assess visitors' attitudes towards the Museum. Between 1991 and 1993 the Museum carried out a series of small-scale pilot projects. The aim was 'to test and introduce new working practices and methods in temporary exhibitions, installations and events' (Porter 1996:10). Individuals and organisations acted as external consultants but most of the evaluation work was carried out by Museum staff. They employed a number of different methods such as peer interviews, comments book, visitor survey, staff interviews and seminar/brainstorming sessions. The findings of those studies were presented in reports and disseminated to the Museum staff. An effort was also made so that the exhibition developers would be involved in the evaluation process. The practices and methods employed during the pilot phase were then applied to larger projects undertaken by the Museum from 1993 to 1995[20]. (MSI 1992a, 1992b, Porter 1996).

[20]This included three qualitative research studies carried out by external consultants and consisted of focus groups discussions. The first study sought to explore why people in the target population did not use the Museum more often. The second study was a front end evaluation for the 1830 Warehouse, the oldest building on the MSI's site. The purpose of the research was 'to clarify the agendas for the building; test the spontaneous reaction of stakeholders to the suggested themes; and to creatively brainstorm around them' (Porter 1996:11). The last study involved the development of the new Textiles Gallery (Porter 1996, Wetton 1996).

The results of the pilot studies seem to have a much wider application than evaluation of the particular exhibition or theme. The key findings of the summative evaluation of the The Gas Gallery (MSI 1992a) were that 'educational' and 'interesting' were the most popular words used by visitors to describe the exhibition; the most popular aspect of the Gallery among respondents was its interactive elements; visitors would appreciate more 'things to do' and theatrical interpretation; there were requests for more information about the future of the gas industry, 'what gas is' and more objects.

The evaluation study of proposed ideas for the Flight Gallery (MSI 1992b) included some interesting points about the Museum's visitor profiles. It pointed that male, white visitors and, among adult age groups, 25-44 year olds were over-represented[21]. Also socio-economic groups A, B and C1 were over-represented. The under 18 year olds constituted 44% of the Museum visitors, the majority of which visited the Museum as members of school parties.

Some of the above points were already known from the '1990 Visitor and Public Awareness Survey' (MSI 1992b). Among the findings of this report were: A and B socio-economic groups and people from Manchester and the South of Manchester made up a high proportion of the MSI visitors; those most likely to be frequent visitors were from 35-55 age groups, had children aged 6-10, and were from the higher social classes[22]. Other findings of the same survey showed that the type of exhibits most associated[23] with the MSI were machinery (22%), trains or steam engines (20%), and aircraft (15%); reasons for visiting the Museum included 'a day out for the children', 'school holidays', 'educational', 'bad weather'; most visitors learnt of the Museum informally (i.e. recommendation) and 17% through publicity (leaflets and press, TV and posters); planning a visit to the Museum was not done a long time in advance (on the same day of the visit or the day before).

Building upon the knowledge gained from the above studies, the Museum commissioned three qualitative research studies. They were carried out by an outside consultant. According to Porter (1996:11) the main findings of these studies showed that the audience wanted the Museum to 'focus on human stories and purposes: not "how does it work?" but "how did they do it?" and "could I have done it?"; to offer people contact with full, working, throbbing, real and sensational exhibits and multisensory experiences – not artificial, abstract, distant, cold; to offer people structure and pace, moving them from one issue to the next; and to draw people close, immersing them – body-on, body-in; to

[21] As compared to the general population. Furthermore, a visitor survey carried out by Business and Market Research Plc in 1990 on the Museum's behalf showed that 44% of the adult visitors interviewed were accompanied by children (MSI 1992b).

[22] The same survey revealed that 44% of the respondents had previously visited the Museum at least once. In 1991, this figure was 54% (MSI 1992b). Furthermore, travelling exhibitions seemed to attract new audiences. More than 50% of the audience for the Star Trek exhibition had never been before (MSI Annual Report 1995-96).

[23] Compared with the 1988 visitor survey (MSI 1992b), this finding indicated an increasingly accurate awareness of what the MSI actually exhibits rather than what is implied by its name.

make the visiting experience reassuring and rewarding: "you have so much potential, you won't fail, we'll let you in on secrets"; to capture people's interest and attention within 2 minutes, or we have lost them'.

The research studies helped the Museum to better understand its audience and their agendas and gave it new perspectives into developing display ideas in order to communicate effectively with its public. These ideas and insights gained from the visitor studies are fed into new exhibitions the Museum is currently developing[24]. The MSI is a fast growing institution which provides for a range of audiences. It is also one of the few science museums in the North of England which encourage hands-on participation throughout its exhibitions. The interpretation of the exhibits in Xperiment! is assisted by having explainers. These facts position the MSI, and Xperiment! in particular, as one of the most interesting hands-on exhibitions that cater for families.

3.4.2 Eureka! The Museum for Children

History and design Eureka! The Museum for Children is the first museum of its kind in Britain. It opened in July 1992 in Halifax where it is housed in a 4,500 sqm purpose-built building. It is a two story, visible steel, stone and glass structure which was designed to be a 'living building'. Chief sponsor of Eureka! is the Clore and Vivien Duffield Foundations. Since it opened, Eureka! has been very popular, especially with school parties and family groups. Eureka! is a registered Educational Charitable Trust (Thomas 1992, The Times Educational Supplement 1992, 12/1994 pers. com.)

Eureka!'s mission statement recognises education as a core function of the institution:

> Education is integral to Eureka!'s approach through providing hands-on exhibits and programmed activities for children which stimulate their natural curiosity. Interaction with exhibits enables children to learn by doing, thereby expanding their awareness, passive understanding and enjoyment of the world in which we live. It also encourages a sense of responsibility for themselves and others, providing a safe and secure environment which families can enjoy together (Eureka! 1993a).

Like all children's museums, Eureka! is a non-elitist institution which aims to be accessible to all members of the public including people with disabilities. Visitors are encouraged to make their own choices concerning the exhibits they use and the activities they get involved in as well as the way they prefer to learn. Eureka! also aims to be a 'meeting point for all those concerned with children and their future, whether parents, teachers, child care professionals, or industry' (Thomas 1992:88).

[24]Such as Fibres, Fabrics and Fashion, Communications, Feeding the City, Flying to the Sun and Manchester Science.

Eureka! houses three main exhibitions: Me and My Body, Living and Working Together, Hello! Is Anyone There[25] (figure A.12). Me and My Body is an exhibition about how the body changes and develops, and how one can take care of one's body. It provides a series of mechanical and computer exhibits. Hello! Is Anyone There exhibition explores a variety of communication technologies and how some of them have changed over the years. Visitors are invited to explore the exhibition by getting involved in a series of co-operative role-play activities. Living and Working Together is the third main exhibition in Eureka! which consists of three different areas: the House, the Bank and the Shop, and the Factory and the Garage. All of them represent environments where people live and work. Visitors are encouraged to explore the design and technology within each environment through role-play. There were two more exhibitions: the Recycle Centre[26] and the Jungle. The first one draws together a number of recycling processes and material from everyday life. Visitors can explore this exhibition through a series of mechanical exhibits. They are also encouraged to make items out of waste products. The Jungle is an area where children under five can be involved in a limited number of mainly physical activities. Eureka!'s education programme is enhanced by a programme of school workshops, INSET activities for teachers and special events for family groups (Eureka! 1990, 1993a, 1993b, 1993d, 1993e).

Enablers are employed in order to encourage visitors to interact with exhibits. They are recruited, managed and trained by the education department. They attend an in-depth, three-day training programme, followed by one-day shadowing. The role of the enablers in the visitors' learning process was acknowledged by the Education Team's Short Term Strategy (Eureka! 1993a) and Eureka!'s Education and Interpretation Plan (1993b). Among the objectives was to continue to enhance the enablers' skills and abilities.

The development process and visitor studies In the development period of the project, a great emphasis was placed on a series of front end evaluation studies. A fundamental approach in the development of the exhibition themes was discussions with a variety of school groups. The main points of the strategy followed were: to identify children's interests; to use existing research into children's concepts; to explore visitors' understanding of the proposed exhibits; to document types of social interaction in front of the exhibits and with the enablers; to check suggested contents with children; and to maximise legibility (Eureka 1992). The schools visited were from both urban and rural areas and represented a wide range of socio-economic backgrounds. This approach helped the research team to identify those areas which required more detailed investigation and the results formed the basis for creating the support material to be integrated into the

[25]This exhibition was also known as Invent, Create, Communicate!, when Eureka! first opened.

[26]In 1996, a new exhibition called Things was developed in the area were the Recycle Centre used to be when this research was carried out. This exhibition is identical with the Things Gallery at the Basement of the Science Museum, London.

exhibitions and the educational material for schools (Eureka! 1992, Thomas 1992).

This approach was used for Living and Working Together. Discussions with a number of school groups revealed children's particular interests as well as lack of knowledge. For example, some children wanted to know whether the manager of the shop had ever been sued and 'some eight-year olds had no concept of what a factory might be or do' (Thomas 1992:90). This kind of finding had considerable implications for the activities that were developed and the range of information that needed to be incorporated into the exhibitions. Research work done by Southampton University was used as a basis for the development of some sections of Me and My Body. For the other areas, however, more detailed studies were carried out by the exhibition team. For example, children's ideas about growing and changing and their worries associated with adolescence were investigated 'by inviting children to help with the writing of a book, the story of a boy and girl who are teenagers, starting to change into young adults, and both of them about to go out on their own, for the first time' (Thomas 1992:91).

At the same time, a series of internal discussion documents were produced from 1990-94 which outlined Eureka!'s mission, the aims and objectives of the exhibitions and of each individual exhibit and how to implement them. During the development phase of Eureka!, the exhibition team produced a detailed description of the exhibition and orientation areas (Eureka! 1990). It included the area name, the item (display), its location, the main objectives, and description of the media of communication employed and the educational activities related to the content of each exhibit. In many cases, it also included a series of questions to be incorporated in the labels or to be used by the enablers with visitors.

At the end of the first six months of operating (December 1992), the need for the development of a structured evaluation programme was identified. A document was produced summarising the front end evaluation work done and the strategy followed. It also identified some of the approaches that could be used in developing an evaluation programme and the resources required for its implementation. Within the next six months Eureka!'s Education and Interpretation Plan[27] was produced (Eureka! 1993b). Each of its sections include a policy statement, recommendations and an action plan. An Evaluation Plan was also prepared by an outside consultant (Eureka! 1993c) which identified the areas which needed to be studied. They set out to evaluate whether the original aims and objectives were being met by examining and describing more closely its audience and their experiences.

A visitor survey (Eureka! 1993f) was conducted during the summer holidays, over a six week period. A random sample of 594 visitors was interviewed. The questions asked were related to visitor profiles, methods of transport, length of visit, satisfaction from the services and value for money. The main findings were that: more than half of the

[27]It is divided into five sections: exhibitions; staffing; visitor services; group visits; and networks which refers to links with other organisations, publications and advisory groups.

sample came from the B and C1 socio-economic and higher educational background; 2% of the visitors were of ethnic origin; 6% indicated that their parties included people with disabilities; the average visiting group consisted of a family with 4-5 members, the majority of which contained an adult female; three-quarters of the adult visitors were between the ages of 25-44 and almost as many adults visited Eureka! as children did; and that children under 5 made up one quarter of child visitors while 72% of them were aged between the targeted age groups (5-12 year olds). The most common methods of transport were: car (80% of the visitors); train (12%); and bus (6%). The most common way of finding out about Eureka! was through word of mouth. The average stay was 3 hours and 40 minutes (Eureka! 1993f).

Along with the market research, a number of the staff were involved in observation studies of visitors at particular exhibits. They made a series of recommendations for future developments and also proposed some changes needed (Eureka! 1993d, 1993e). These reports included a review of the overall objectives of the exhibition areas and the more specific objectives of each exhibit; its content; the role of the enablers; development of resources for school and family groups; further research needed and proposed changes; cost; and future developments. Building upon the work done and the experience gained, the education team drafted a Short Term Strategy to review its activities and set priorities for the future development of Eureka! They intended to keep the Plan under continual review. In the period that followed, Eureka! underwent a series of changes. Most of the experienced staff who worked on the project from the beginning left. Eureka! was without a director for large periods of time. Moreover, the resources necessary to implement changes and expand the exhibition space were not available. The morale of the junior staff was very low due to lack of commitment from senior staff members. For the next couple of years, a Policy for Environmental Excellence[28] was introduced (Eureka! 1994b) by the then Head of Education and a Visitor Survey was conducted (Eureka! 1994a) by the then Head of Marketing.

The 1994 Visitor Survey (Eureka! 1994a) was similar in structure to the 1993 Visitor Survey (Eureka! 1993f). Eight hundred family visitors were surveyed during the summer. It concluded that the profile of the Eureka! visitor had changed little from the previous year. According to it 'the typical visitor is a white (95%) female (52%) aged from 25 to 44 (77%). She is visiting with her male partner and two children, a girl and a boy both aged 4 to 10 (70%). They heard about Eureka! from family or friends (47%) and decided to visit for a day out for the kids (27%). They decided within the last week to come (65%). The family travelled by car (82%) from their home within 2 hours drive time of Eureka! (85%). It is their first visit (78%), though the children may well have been before with friends or school'.

Eureka! is the only museum of its kind in the UK. It aims at providing hands-on

[28]This was a discussion document but it was not taken further.

experiences for children and their families. Although it draws on the traditions of the international community of children's museums, it is specifically designed for children, families and people who work with children in this country. Like the MSI, Eureka! has carried out many visitor studies in order to understand and provide for its audience's needs. Children from across the UK were involved in the research and development phase of Eureka! Hence the knowledge, needs and expectations of its audience were accommodated into the design of the exhibitions. Visitors are encouraged to explore the exhibitions by using all their senses and through social interaction with the enablers. Eureka! therefore shares many characteristics with Xperiment! at the MSI which makes the two cases studies comparable.

3.4.3 The Archaeological Resource Centre

History and development The Archaeological Resource Centre together with the Jorvik Viking Centre and the Barley Hall were three projects undertaken by York Archaeological Trust (YAT). YAT is 'an independent charity devoted to rescue excavation[29], research, publication and presentation of the results of archaeology for the benefit of the public' (YAT 1990:1). The Trust was founded in 1972 and has been involved in many excavation projects in Yorkshire (YAT 1990, Addyman 1981). This means that the Trust is also 'faced with the task of archiving data, conserving artifacts, post-excavation analysis, publication of the results and permanent storage of the excavation product' (YAT 1990:12).

The largest share of the Trust's resources is devoted to post-excavation work[30]. Substantial resources have also been invested in the preservation of evidence of York's past. This is recorded in the Trust's archives. Related to the archives are a number of other resources such as a collection of 12000 aerial photographs of York and the surrounding area; and the library which contains books and articles on York and on British and foreign excavation reports, microfiches of all site records and slides (YAT 1990, Kyriakou 1992).

YAT also organises a whole range of educational activities. It provides school visits to the ARC and to the Jorvik Viking Centre, responds to requests for talks at schools or evening classes for adults, establishes links with Universities, runs The Jorvik Club and The Young Archaeologists Club, has launched a Scholarship for Young Archaeologists and organises conferences, seminars, lectures and site visits (YAT 1990, CBA 1985).

The ARC is housed in a 15th century medieval parish church of St. Saviour in central York. YAT began using the church in 1977 for the storage of bulk finds from excavations. Following several decades of neglect, restoration work was carried out from 1986 to 1989,

[29]It is an activity which involves excavation work done in advance of redevelopment. It is an attempt 'to "preserve by record" that data which cannot be left in situ' (YAT 1990:12).

[30]This includes site analysis and specialist research, and the publication of reports. The co-ordination of the post-excavation activities is the responsibility of the Research and Publications Panel.

transforming the building into a centre for research and visitors. This work was prompted by the tremendous success of the Jorvik Viking Centre and visitors' comments[31] (CBA 1986, YAT 1990, Kadow 1990, Knaggs 1992, Jones et al 1990).

The ARC opened experimentally in February 1990, free of charge, and began charging on the 1st April 1990. Its main objective is

> to demystify archaeology and raise its public profile by appealing to visitors of all ages and backgrounds (Jones at al 1990:1).

Its purpose is two-fold: to provide storage facilities and office space for the Finds Department and Finds Researchers; and to offer an education service in its Archaeological Activity Area, where visitors can discover what archaeology is. (YAT 1990, Jones et al 1990, Jones 1995).

ARC has been popular with family groups and school groups alike. The number of visitors seems to be growing since it opened: from 33,000 in 1990 to 65,229 in 1993 (Jones 1994).

The Archaeological Activity Area The exhibits displayed in the Archaeological Activity Area or AAA (the exhibition area on the ground floor) were developed by a team of researchers, designers, computing staff and employees of the Trust along with specialist advice from researchers in the University of York. Their objective was 'to design an academically sound yet exciting place for everyone interested in archaeology and what archaeologists do [...] Each exhibit had to be safe, engage visitors' attention for approximately seven minutes and be easily reset' (Jones 1994:3).

On entering the ARC, a member of the staff (professional archaeologists or trained volunteer demonstrator) explains what visitors will see and do. Visitors watch a multi-slide presentation[32] (figure A.23) which introduces them to basic aspects of archaeology then they move on to the main exhibition area where they are invited to handle and sort archaeological finds. In this area, volunteers are available to help people work and understand the exhibits. Acting as interpreters for the exhibits, the volunteers respond to visitors' questions and needs on an individual basis. This is made possible by regulating the number of visitors (up to approximately 30 people each time) who can watch the video and then complete the activities at the same time (Jones et al 1993, ARC 1993, 11/1994 pers. com.).

The AAA is divided into three areas: Finds Handling, Experimental Archaeology and Computer Interpretation. The Finds Handling area is the first section. It includes

[31] The project was founded by the Jorvik Viking Centre and by Staggs Foundation of the USA. YAT also launched a fund raising campaign in order to cover the remainder expenses for the refurbishment and improvement of the building (Knaggs 1992).

[32] The introduction to the ARC tries to challenge attitudes and interpretations towards the past. Market research carried out before the opening of the Jorvik Viking Centre showed a series of misconceptions the public had about the principles and practice of archaeology (Addyman 1990).

four activities concerned with the handling, sorting and identification of archaeological materials. At the finds sorting activity visitors are given a tray of unsorted bulk finds material and are asked to sort them into material types, and then to label each group of materials and put them into bags. There is a pottery activity where visitors are provided with a number of pottery shreds and some information about the original object with which they try to match the shreds up. The main aim of the sieving activity is for visitors to identify various types of environmental evidence laid in trays and to place them in different categories. The last activity in this section is about animal bones. Visitors can match modern cow bones with Viking cow bones and then fit the Viking leg bones into a diagram (ARC 1993, Jones 1995).

Seven activities make up the Experimental Archaeology section which covers four areas of past technologies. The Viking padlocks activity constitutes two replica Viking locks which fasten a wooden chest. The visitors should choose the correct keys from a wide selection to unlock the chest. Next to it, three writing technologies are demonstrated: the runes, pictographs and the use of slates. In this section, visitors can also spin wool into yarn and weave cloth by using a replica Viking loom and can get involved in shoe-making. They are encouraged to stitch together copies of Roman leather shoes (ARC 1993, Jones 1995).

In the Computer Interpretation section, there are three groups of two terminals aiming at demonstrating the use of technology in the work of archaeology such as AutoCAD (plans and maps of excavation), CIFR (finds recording system) and interactive video (exploration of an excavation). There is also a computer system which includes data entry of 2655 records of the St Saviour's parish census returns. This can be interrogated by visitors by giving any Christian and family name or other family details (ARC 1993, Owston 1992, Jones 1995).

Each display is accompanied by a booklet which explains the task and gives further information. Additional resources are available on request. These include artifacts, books and pictures which the volunteers can show visitors.

On the first floor, visitors have the opportunity to view the architecture of the building as well as researchers at work. There are often temporary exhibitions and a notice board with general information about archaeology such as about excavations and sites open to the public. Outside there is an archaeological garden growing plants known to have been used in York in the past and containing a collection of architectural fragments (ARC 1993).

The ARC employs three paid staff as well as volunteers[33] whose main task is to help visitors use the exhibits, to interpret the activities and to provide further information on request. The volunteers attend an induction session which consists of a full tour of the building and introduction to the activities. It also covers health and safety, fire procedures and first aid information. After basic training in the activities, volunteers have opportuni-

[33]Usually high school or university students on work placement but also senior citizens.

ties for further training by attending lectures and seminars, visiting other departments in York Archaeological Trust and watching excavation work in progress. Volunteers are also provided with the Training Manual which introduces them to the function and operation of the ARC, the history of the building, states what the messages are that each individual exhibit is supposed to get across and gives some basic information about each exhibit (ARC 1993, 11/1994 pers. com.).

Visitor studies The development of the ARC is very closely related to the building of the Jorvik Viking Centre and the interest it stimulated in archaeology. According to Addyman and Gaynor (1984:9), 'the Jorvik Viking Centre has been built as one possible answer to the problem of preserving some of the less durable remains of the past in a context where they make some sense'. The Jorvik Viking Centre was built at the Coppergate site where YAT had carried out rescue excavation in advance of the redevelopment of the site. YAT in co-operation with York City Council decided to build 'an underground archaeological basement below a shopping arcade' (Addyman and Gaynor 1984:9). The decision to preserve the artifacts found in the site had public support. The excavation at the Coppergate site, which was open to inspection, proved to be popular with the public. Market research carried out showed that people were outraged that the archaeological remains would be destroyed by the new development (Addyman and Gaynor 1984, Addyman 1981).

The Jorvik Viking Centre stimulated but did not completely satisfy the public's interest in archaeology. There was a demand for an introduction to archaeology. The idea for a hands-on archaeology centre was soon launched. As there were no similar hands-on centres with an archaeological theme, the group visited science centres in the UK to assess the various approaches adopted. After establishing a series of activities, a design brief was put together. The research undertaken at this stage was an analysis of visitor markets[34] and a series of discussion focus groups to test the concept (Kadow 1990, Jones 1995).

Although no systematic research has been carried out by the ARC to evaluate the effectiveness of the exhibits[35], the staff has a good understanding of its public. The size of the exhibition area and the number of visitors who can be involved with the activities at one time allow for a personal contact between the volunteers and the visitors. Recently, a market research study was carried out. It involved self-administered questionnaires which were located on the first floor (ARC 1996). It was aimed at all visitors except for school groups and included some demographic questions, motivation for visiting and general questions regarding the planning of the visit to York. The main results[36] were: most of

[34]It involved assessing 'the viability of the ARC as a hands-on centre' and evaluating 'its potential as a visitor-attraction' (Kadow 1990:36).

[35]A couple of studies have been undertaken by undergraduate students in partial fulfilment of their course which are not included here as they are small-scale and unsystematic studies.

[36]Due to the voluntary nature of the survey, the results should be treated with caution.

the respondents visited the ARC (79%) as part of their visit to York; a high number of the respondents (86%) had visited other attractions on the same day; 81% stated that they had visited 1-3 other venues in York on the same day; although half of them had heard of the Centre before, only 11% had been before; the ARC leaflet (25%), word-of-mouth (19%) and a visit to the Jorvik Viking Centre (19%) were what prompted them to visit; more than half of the respondents (63%) were UK residents while 19% of them were living in Yorkshire and Humbshire; 70% were in York on holidays for more than one day (53%) or only for the day (31%); they were living in a hotel (30%), guest house (28%), with friends (13%) or in a caravan (12%); almost half of the respondents (48%) were visiting with family; and 38% were from the age range 35-44[37]. The most popular sections given by the respondents were the Finds Handling and the Experimental Archaeology.

As was the case in the two previous museums, the ARC aims to introduce visitors to the subject matter through hands-on exploration. All the activities are designed to accommodate small groups of visitors. This factor and the presence of volunteers enhances social interaction between visitors, especially family groups. The ARC is also an Independent Museum located in the North of England. Although not much research has been carried out in the ARC, the development process was informed by visitor and market research carried out by the YAT for the Jorvik Viking Centre. The experience and insights gained from this project were fed into the development of the ARC. Hence, the ARC was designed to meet the needs and expectations of a range of audiences, including families. These characteristics of the ARC were the basis on which the choice was made and make it comparable with the previous two case studies.

3.5 Conclusion

This chapter presented an overview of the development and role of hands-on museums and defined the associated terminology. It also presented the three museums that constitute the case studies of this research and the reasons for their choice. This sets the context for the presentation of the findings in the next three chapters by describing the way these institutions function. The presentation of the visitor studies and market research undertaken by the museums or on behalf of them, forms an important element. Besides providing a basic understanding of the audience of the museums, it will also be used for comparison with the findings of this study.

[37] Furthermore, there was an equal number (15%) of visitors between the ages of 25 and 34, and 45 and 54 who volunteered to answer the questionnaire. Only 9% of the respondents were above 55 years old.

Chapter 4

Methodological approach

4.1 Introduction

The methodology employed in this thesis was designed to accommodate the research questions of this project. The approach is qualitative in nature and aims to explore the categories through which family visitors describe their museum experience. It also provides data that can be used comparatively against other visitor studies in museums. This chapter presents the methods used and the rationale behind this methodological approach.

4.2 The nature of qualitative research

Kirk and Miller (1986) have described qualitative research as 'an empirical, socially located phenomenon, defined by its own history, not simply a residual grab-bag comprising all things that are "not quantitative" ' (in Silverman 1993:31). Although this is not a comprehensive definition of qualitative research, it may be the closest one can get. There have been many attempts to define qualitative research mostly in terms of what qualitative research is not and what differentiates it from quantitative research. Yet, it seems that there is not an agreed approach among qualitative researchers. This is not surprising since qualitative research has grown out of different research traditions. Qualitative research is usually associated with the interpretive 'school' of social science while positivism – the other main school of 'social' science – is associated with quantitative types of research.

Many of the studies – both basic research and evaluation – which have taken place in museums are positivistic in approach in the sense that they seek to test correlations between variables. They have been driven by the need to assess the effectiveness of exhibitions and services provided to the public. They have, consequently, used a set of ad hoc procedures to define, count and analyse their variables. As a result, these studies tend to focus on one aspect of the visitor museum experience. In this case, therefore, the researcher would predetermine the categories with which visitors' experiences are to be analysed, understood and accounted for. Furthermore, by focusing on one function of the

museum, they may miss 'various other social and cultural functions which museums may serve' (Macdonald 1993:7).

However, the distinction between qualitative and quantitative research has increasingly become less clear-cut. As Miles and Huberman (1994:4-5) explain, 'at the working level, it seems hard to find researchers encamped in one fixed place along a stereotyped continuum between "relativism" and "post-positivism" [...] In the epistemological debate it is tempting to operate at the poles. But in the actual practice of empirical research, we believe that all of us – realists, interpretivists, critical theorists – are closer to the centre, with multiple overlaps [1]'.

This of course does not mean that qualitative and quantitative research overlap. However, there are points of continuity, as well as difference, between them. Discussion of the theoretical basis and the subject of the research, and methodological and analytical issues are central to the debate about different research approaches.

4.3 What is qualitative research?

As discussed above, qualitative research has been associated with the interpretive social science tradition, in particular with interactionism, ethnomethodology and phenomenology. However, researchers in other disciplines such as anthropology, education, media, cultural studies and also areas with interdisciplinary orientation such as museum studies and women's studies rely on qualitative ways of inquiry[2].

The attempts to define qualitative research derive from the researchers' biases or preferences towards a particular methodological and analytical approach. Miles and Huberman (1994) accept the 'naturalist' nature of qualitative research and characterise it according to eight 'recurring features'. These features are set out in table 4.1.

Although Miles and Huberman identify the above criteria as the 'core' features for naturalistic studies, they also recognise a wide variation between different research traditions.

Silverman's (1994:28) argument runs along the same lines: 'unlike other research which usually shares a common model [...] field research depends on a variety of theoretical positions with very different implications'. He also offers his own account of qualitative research (table 4.2) based on Cicourel's, and Hammersley's and Atkinson's ideas.

In a recent work, Mason (1996) underlines the problematic character of any attempt to define qualitative research. She specifies some common features of qualitative research which are presented in table 4.3.

Point three in table 4.3 is also considered by Strauss and Corbin (1990) as the distinctive characteristic of qualitative research. They, too, recognise the possibility of some

[1] A similar view is adopted by Silverman (1993).

[2] For a discussion on the above approaches see Silverman (1993:47-143), Miles and Huberman (1994:5-9).

1. A preference for a 'field or life situation' as a primary source of data
2. Aiming at a 'holistic overview of the context under study: its logic, its arrangements, its explicit and implicit rules'
3. Taking the perspective of the 'local actors'
4. Employing and maintaining the original expressions of the local actors throughout the study
5. Understanding actions and meanings in their social settings
6. Theoretically driven interpretation of the material
7. Favouring relatively unstructured research design (the researcher as the main 'measurement device' in the study)
8. A preference for the use of analysis based on words.

Table 4.1

One version of qualitative research (Source: adapted from Miles and Huberman, 1994:5-7)

1. 'Field research should be theory driven rather than determined by technical considerations'
2. Given that members of society employ theories about social order, field research should examine social phenomena as procedural affairs
3. Field research should 'attend to common-sense assumptions about what constitutes the "field" '
4. Qualitative research depends on watching people 'in their own territory'.

Table 4.2

A descriptive model of qualitative research (Source: adapted from Silverman, 1993:29)

of the data being quantified but they still believe that the analysis itself is a qualitative one. Indeed, few qualitative researchers doubt this point. Some researchers also argue that qualitative research should be systematically and rigorously conducted; that research should be designed and decisions made at an early stage but they should be flexible and contextual. Given that the researcher cannot be neutral, s(he) should be aware of his/her actions and role in the research process (reflexivity). Qualitative research should provide not just descriptions but explanations of social phenomena based on situated and textual data. The researcher should not appeal to a single element as an explanation but rather focus 'upon the processes through which the relations between elements are articulated' (Silverman 1993:208); (s)he should also try to generalise these explanations to a larger population so as to avoid an anecdotal basis of the claims made (Silverman 1993, Mason 1996).

The above points are very important for understanding the design and decisions made throughout this thesis. The diversity of families and the physical and social context of

1. A preference for an approach grounded in 'interpretivism' – 'concerned with how the world is interpreted, understood, experienced or produced'
2. A concern with the use of methods of data gathering 'which are flexible and sensitive to the social context in which the data are produced'
3. An emphasis on 'holistic' modes of analysis and interpretation rather than the use of statistics. However, in principle, there is no reason to prefer any form of data: 'qualitative research usually does use some form of quantification, but statistical forms of analysis are not seen as central'

Table 4.3

Mason's version of qualitative research (Source: adapted from Mason, 1996:4)

the museums had to be considered. One of the main focuses of this research was to let family visitors describe their museum experience in their own terms and give all family members the opportunity to be heard. Although there were certain ideas which this study would explore, it was important to look at the museum experience from visitors' perspective. This approach was felt to be sensitive to the visitors' point of view and provided a holistic overview of the family visit in the museum context. The actions and meanings of family visitors had to be studied in the social context of the museum if they were to be interpreted and understood. The initial decisions about the main focus and aims of the study were made at an early stage. However, this approach was flexible and allowed for new perspectives to be included during the collection of the data. The analysis of the data could therefore be based on and encompass different approaches which is very important for a multidisciplinary study of this type. Furthermore, the presentation would convey a flavour of family visitors' ideas by using the language and concepts they used. In order to achieve this, extended quotes are presented which give a feel of the context in which things were said.

4.4 Research design

The research design was based on an extensive review of the visitor studies literature. Particularly influential on the design of this research has been other qualitative studies of museum visitors and also studies which focused on family group visitors in informal settings. Although some strategies from previous studies were employed, they were adapted to meet the aims of this study. What differentiates the research design of this thesis from those of previous studies on family museum visitors is its emphasis on the social nature of the family which, following Gurium and Holstein's (1987) argument, is not seen as a 'uniform phenomenon'. It is instead 'occasioned' and 'contexted' and in this case is studied as such in the museum environment. This is a crucial point for the clarification of the rationale of the methods used. The definition of the terms 'family', 'learning' and 'hands-on

museums' made the design of the research more focused and informed the development of the observation guidelines and the questionnaire.

Furthermore, an extensive survey of the reports on visitor studies and market research carried out by the museums used as case studies, and the policy documents (such as communication policy and mission statement documents) was undertaken. This preliminary work provided an insight into the agenda of the institutions studied and helped with further defining the aims of the study. Research or evaluation data gathered by the museums are often compared with findings of this study where possible.

The details of the method were developed and refined during a pilot study in the Science Museum in London and the Museum of Science and Industry in Manchester. Also those details which differ from one case study to the other were tested in the particular museum for which they were developed. Thus, the pilot study took place at different stages throughout the research. In particular, the tests for developing a guide for recording observational data took place in the Science Museum in London for a week in February and another one in July 1994. The observation sheet was then tested in the Museum of Science and Industry in Manchester on a regular basis for approximately a month in January 1995 together with the questionnaire protocol. However, the parts of the questionnaire which differ for each museum were tested on visitors at the three museums separately in January 1995.

Thus, the observation guide itself and the questionnaire protocol were pre-tested and then tested again but also reviewed by other researchers. During the pilot phase of the research, the aims of the thesis were further defined and some hypothesis was generated. A small body of data was gathered during the pilot study which was then studied to see whether the hypothesis related to it. This was a process of comparing cases and searching for deviant cases. One of the things that came out of this process was the role that gallery staff (explainers/enablers/volunteers) played in each museum and how this was perceived by the family groups. This factor, although it was anticipated, seemed to vary considerably among the case studies. Gallery staff were originally thought to be an important element of the museums studied but they were seen as a more or less homogeneous group. As a result, the design of the research was reformulated to include more elements of the social and physical environment of the museum and how they affect the experience of the family groups studied. This body of data was also used as a basis for deciding on how the data was to be analysed. This involved developing a set of categories arising from the data and comparing and discussing it with other researchers. As a result of this process an observation technique was adopted and the questionnaire was adjusted to allow for more prompts to be used following a question. This allowed for more flexibility as the prompts could accommodate individual differences in the way the questions were answered. The observation technique was based on the one used by Faria (1994) to observe families in the Natural History Museum in London but it was adjusted to meet the needs of this research.

4.4.1 Data collection, management and analysis

The main aim of the data-gathering phase was to encourage members of family groups to talk about their own expectations and experience of their museum visit in the groups they visited. In particular, the researcher was interested in trying to elucidate the categories through which members of the family groups expressed: their agendas for the visit; different categories of agendas; how these agendas interrelate with the social and physical environment of the museum and affect the learning behaviour (in particular) of the group members; and the ways in which family members reconstruct their visit. An emphasis was put on documenting their motivation for visiting and becoming involved in all sorts of activities during their visit and how this related to the theme of the exhibition. The aims and the focus of the research determined the methods which were adopted and the nature of the analysis used. Thus, an observation guide and a set of interview questions were created which accommodated the approach and the subject of the research.

Most studies of visitors in museums focus on what visitors learn or experience measured against the message the exhibition intends to communicate. As a result, the museum experience (including learning) is seen and explained through preconceived categories which derive from the messages that an exhibition sets out to communicate[3]. However, new research (MacManus 1987, 1988; Macdonald 1992, 1993; Borun, 1990) has shown that visitors come to an exhibition bringing with them physical, intellectual and social needs, expectations, ideas and preconceptions. These inevitably affect the nature of their visit and their responses to the exhibition. Furthermore, during the visit they become physically, intellectually and emotionally involved in various activities in a social context. During this process, visitors are engaged in working with exhibits alone or with other people, gathering and processing new information, reinforcing what they already know or viewing things from a different perspective. That is, they 'read' an exhibition in different ways.

In this thesis, those 'readings' are not limited to the families' responses to the printed words, to the exhibition layout and objects. They also encompass the choices and movements which family groups make during the visit. This thesis builds upon previous visitor studies of family museum visits but also differs in its approach. Instead of making assumptions about an experience of a visit to a museum, it attempts to gain an insight into the museum experience through the family members' – both adults' and children's' – readings of the exhibitions.

The analysis of the data gathered from the family observations and interviews looked at family visitors' descriptions of their experience and movements during the visit. Thus, the categories or patterns described have emerged from the families' accounts of their visit and the family observations as they were understood and interpreted by the analyst. The observations were recorded in a narrative form (table B.1) and were based on a series of

[3]For a discussion on this see Macdonald (1992, 1993).

family interactions (appendix B). In the analysis, the family observations were treated as text. The analysis was also supported by enumerating instances of observed behaviour (appendix C) related to the behavioural categories identified in the observation guide (appendix B).

There were different levels of investigation: looking at patterns across the data, at deviant cases and more individual accounts of the visit, and how these relate to the demographic characteristic of the family groups. For the creation of the categories for the first stage of analysis, the analyst employed phrases used by family members to describe an idea or concept. At the next stage descriptive categories were used. Abstract categories reflect the interpretation imposed on the data. In the presentation of the findings, both descriptive and abstract categories have been used. The analysis and management of the data was assisted by computer software, namely the NUD• IST. NUD• IST is designed for storage, coding, retrieval and analysis of text and provides the types of actions and features required for various methods of text analysis.

Thus, the analytic practice involved a set of 'moves' arranged in the following sequence: sets of the data were coded and explanations of the codes or any reflections were recorded in the form of memos; similar phrases were identified; patterns and themes started emerging which were compared to identify differences and similarities between subgroups[4]; patterns from the three case studies were compared and deviant cases were identified (with the help of diagrams made with the assistance of NUD• IST); gradually, small sets of generalisations were elaborated; and, finally, a coherent storyline was built based on these generalisations[5].

4.5 Choosing the case studies and gaining access

As mentioned above, three museums were chosen as case studies: the Museum of Science and Industry (MSI) in Manchester, Eureka! The Children's Museum in Halifax, and the Archaeological Resource (ARC) Centre in York. The museums were selected according to three main criteria. They are committed to providing for family group visitors; they represent different types of hands-on museum; they are Independent museums; and they are all located in the North of England.

After initial contact with the three institutions during which the focus and aim of the study were outlined, visits to the institutions took place. These visits and formal and informal contacts continued for almost four months. During this period, an extensive survey of the documents produced by each institution was carried out. These referred to their philosophy and aims, and also to studies of their audiences, especially family groups. By the end of this period contact with two key individuals members of the institutions staff were established and then further developed and sustained until the study was completed.

[4]Each stage of the data collection (including the pilot stage) involved the same 'moves'.

[5]This set of analytic 'moves' was based on ideas of analytic methods from Miles and Huberman (1994), Silverman (1993), Strauss and Corbin (1990, 1994).

These individuals were senior managers and those involved in the management of the galleries (junior managers or education staff).

4.6 Methods used

A mixed methodology was developed, the core of which were the observations and the interviews with family groups, and children's drawings. The methodology involved observing family groups unobtrusively as they moved through the exhibitions. The same groups were then asked to participate in an interview which involved taking them to a different room within the museum. The drawings were made by children at the end of the interviews. Secondary data were used and discussed. Secondary data mainly refer to a sub-section of the museums' audience, the family group visitors.

4.6.1 Family observations

Given the emphasis of this thesis on the family agenda and its role in constructing meaning out of the exhibition, it was important to observe the movements which families make during their visit and any interactions. Verbal exchanges were considered to be an important part of their readings of the exhibition. However, it was not always possible to hear and document them while, at the same time, trying to be unobtrusive.

Family groups were followed throughout the exhibition[6] and their behaviour and movements were recorded. This included date and time, length of observation, number and sex of each group member, the route they had taken, the total time spent in each area and more specific information on different types of interactions. The observation protocol consisted of blank A4 piece of paper as the composition of the families varied. As soon as a family was chosen to be observed, each family member's movements were recorded under a column (table B.1). An observation guide and coding system was developed in order to focus attention on specific observable actions and record them (appendix B). This was particularly useful for recording what was happening in detail, in particular the sequence of events, interactions, and the context in which they were taking place.

The observation data helped the interpretation of the interview. For ethical reasons there was a sign at the entrances of the exhibitions to inform visitors that observations were being carried out. However, hardly any visitor seemed to take notice of them and/or to be aware that they were being followed.

4.6.2 Selection of subjects

The families chosen for observation included groups of various compositions in terms of age range, gender, number of members and background. The groups selected consisted of

[6] In the case of Eureka!, families were observed in two of the three exhibitions.

at least one child (up to the age of 16) and one adult, and of no more than five members in total. Visitors between the ages of 16 and 18 are referred to as young adults. This selection was made for merely practical reasons as there was only one observer. There was no maximum age of adults. The identification was made purely on the basis of appearance but in the analysis of the data only families of close kinship were included. Family groups were selected as they entered the exhibition. Every third group was chosen. Families from minorities or families visiting the UK as tourists were also included as long as they spoke English.

An effort was made to cover all possible days and times of the week both working days and holidays (including bank holidays and weekends). Both observations and interviews with family groups took place between February and June 1995. For each museum, minor changes were made in the timetable as the field research proceeded[7].

In total 121 family groups were observed in all three museums. Fifty observations were conducted in the Museum of Science and Industry in Manchester, thirty-six in Eureka! and thirty-five in the Archaeological Resource Centre. This represents a total of 248 individuals. The observational notes made by the observer were transcribed. Not all groups observed agreed to be interviewed. The following analysis concerns paired observations and interviews from each museum. There were 29 for the Museum of Science and Industry, 29 for the Archaeological Resource Centre and 28 for Eureka!

4.6.3 Family interviews

In-depth interviews were conducted with the family groups. The questionnaire was semi-structured and, although there was a protocol, it was not always followed in the same sequence. However, there was a general plan which was followed. Prompts were used either as examples for respondents or to encourage them to expand on any points. Different questions were drafted for children and adults as a means of drawing all family members into the discussion and sustaining the social nature of the group. The interviews were conducted in a separate area close to the exhibitions. This helped to keep the family away from the distractions of the noise and other visitors in the exhibitions. Interview responses were tape recorded and transcribed in the form of analysable text.

To some extent the interview was a type of mini focus groups. It could also be said that the researcher acted as a participant observer during the interview since 'whatever the topic addressed by the questions, interviews are social events based on mutual participant observation' (Silverman 1993:94). That is, both the interviewer and the interviewees were participant observers in this social event. Family members had the opportunity to form and negotiate their ideas about the exhibitions. This process is an important part of the data. It also became a part of the museum experience of the family groups. Many visitors commented on the fact that they felt they were special in having the opportunity to go

[7]For example, it was soon established that families visited the ARC on weekends and holidays only.

'behind the scenes' (the interview room). Some also mentioned that they would share this experience with other members of their family when they got home.

The questionnaire was divided into sections to try to highlight the issues of particular interest. It was designed to avoid making a direct connection with learning – neither the term itself or any synonyms were used – because of the different meanings visitors might attach to it. However, some of the questions asked can only be understood in relation to the broad definition of learning adopted in this thesis. To assist families with their task of reconstructing their visit, pictures of exhibits were shown to them. The sections were:

Preparing the visit In this section the focus was on ideas about the museum visit; museum visiting patterns; motivation for visiting the museum; different agendas of adults and children.

The visit This section explored visitors' ideas about the purpose of the visit and how it relates to every day experience; perceptions of the role of the gallery staff; ideas about the subject matter and about the nature of hands-on museums.

The visitor Socio-demographic data of the adult visitors: age, sex, occupation and educational level.

While the adult family members were filling in the demographic questionnaire, the children – especially the younger ones – were encouraged to make a drawing of their favourite exhibit. The drawings were interpreted by the children as they were drawing or when they had finished. This information was either recorded or notes were taken. At the end of the interview, notes were also taken on the general impression of the groups observed, on things that happened before and after the actual recording of the interview and on how busy the exhibitions were. These were also transcribed. The average length of the interview was 8 minutes, the shortest being 5 minutes, and the longest 14 minutes. Adults spent approximately 10 more minutes filling in the demographic questionnaires while the children were drawing. In the interviews the gender is indicated by the following division: I for interviewer; W for woman; M for man; B for boy; and G for girl. Capital letters followed by a dot stand for the names of the speakers and other museums mentioned by the family members. The following transcription symbols are also used: three dots in parenthesis (...) indicate an untimed pause; a double slash (//) indicates the point at which a current speaker's talk is overlapped by another's talk; parenthesised words (word) are possible hearings; a question mark in parentheses (?) indicates the transcriber's inability to hear what was said; and brackets { } contain transcriber's descriptions rather than transcriptions. The letter and numbers in the parenthesis refer to the interview transcripts. A full questionnaire is included in Appendix D. Examples of the prompts and follow-up questions are included but they were asked where appropriate and were worded according to the response.

4.6.4 Children's drawings

Children's drawings have not been studied much in relation to museum settings. They were first suggested as a valid evaluation tool by Coe (1988) who believed that they can be used to assess what children learn from zoo exhibits. However, this work lacked any theoretically driven interpretation. Children's drawings were used in a study (Moussouri 1993, 1997) in order to assess children's understanding of space in a museum setting. This work was based on Piaget's and Gardner's ideas about the development of spacial abilities in children.

Children's drawings is a type of making activity closely related to play. Understanding the significance of play and artistic activity in human development is important for museum learning, especially for hands-on museums which have been designed as environments that promote playing with and exploring concepts and ideas. Drawings as well as play represent children's ability to perceive, use and represent symbols. Using the metaphor of the 'canvas', Dyson (1990) referred to the combination of drawing and talk as children's shared dramas where they can explore new possibilities in their marks and communicate it to others. Artistic activity is a type of making activity which is more focused than play. Artistic activity involves the interaction of various symbol systems such as language, drawing and music. It is an activity in which children symbolise their feelings, perceptions and actions by using different means of communication. The development of this ability in children supports the acquisition of basic symbolic tools of their culture (Gardner 1973, Dyson 1990). Although play is related to children's artistic production, the former is a egocentric activity exercised for its own sake. According to Gardner (1973:166), 'art is a goal-directed form of play'.

Children's play has been identified by many researchers as an activity through which children construct much of their reality (Piaget 1962, Gardner 1973, Steffe and Wiegel 1994). Various stages of children's play activity have been identified (Piaget 1962, Vasta et al 1992:544-552, Meredieu 1981:36-62). According to Gardner (1973:164), 'the purpose of play is contained in its unfolding: The child is guided less by a desired end result than by the proclivity to explore exhaustively the implications of his schemes or actions[8]'. Gardner views play as an operation of children's 'making system[9]' where children experiment with different making activities. However, this is not a random activity. It is rather a key component of a child's development as 'the child is able to make manageable and comprehensible the overwhelming and perplexing aspects of the world' (Gardner 1973:164). Role-play[10] and simulation of play (Steffe and Wiegel 1994) have increasingly been used

[8]This description is supported by Piaget's (1962) description of play as an assimilatory activity during which the children adjust the world to their actions.

[9]This refers to children's ability to use and understand different symbolic systems and their physical capacity to direct and control this activity.

[10]For more information on the use of role-play in educational research see Cohen and Manion (1994:252-270).

in educational research as research and evaluation techniques. Unlike children, adults are not comfortable with goalless activities and they do not tend to play. Even when they do, they tend to constrain the activity by imposing rules usually associated with formal play or with artistic activity (Gardner 1973).

For many young child family visitors, museums are novel environments. Through their drawings they were able to use previous experiences to represent new situations and feelings just like the adults or the older children did through language. Drawings reflect children's readings of the exhibition. As was mentioned above, children's own interpretations of their drawings were recorded. Their behaviour and response to their drawing were also recorded. This includes their movements, sounds, comments and emotional response. The limitations related to this method of data collection included: children becoming attached to their drawing and taking the drawings with them; some of them did not want to make a drawing at all; it is an activity which can take children longer than the time available; and it cannot be forced. Also, coloured pencils could not be used in the space where the interviews were conducted and this may have deterred some children from making or offering their drawing for the purposes of this research. Some children wanted to take their drawings home in order to finish or improve them. Finally, there were a few children who were not familiar with drawing or whose drawing was not related to the exhibitions.

4.7 Conclusion

The choice of methods employed in this thesis reflect the research questions and the aim of this study. They aimed to sustain the social interaction of the family groups studied and to provide all family members with the opportunity to produce their own accounts of the visit. Using multiple research methods the research questions were approached from different angles. The organisation of the data allows for both a comparative and individual analysis of the data, across and within the case studies. Hence, the analysis can be done on different levels: first by generating patterns across the data in all three case studies, and at the same time by distinguishing individual cases within them and sustaining their distinctiveness. This process provides holistic explanations for each case study and allows the comparison of the explanations between them.

Chapter 5

Case Study I: The Museum of Science and Industry (MSI) in Manchester

5.1 Introduction

This chapter presents the first case study, namely the Xperiment! gallery at the MSI. The research employed unobtrusive observation and interviews with the families to record the experience of the family groups in their own terms. In particular, this chapter discusses how the agenda of the 29 family groups who participated in this study is formed and how it influences the museum experience of the groups. The discussion follows the movements and the evolution of the families' ideas through space and before, during and after (ie during the interview) the visit.

The composition and the background[1] of the family groups, their motivation for visiting the MSI (socio-cultural patterns), their personal and social expectations (the personal and social context), and their ideas about the Museum influence their agenda for the visit. The family agenda and its interaction with the agenda of the Museum define the experience of the family groups. The formation of the family agenda is a dynamic process which extends before and after the actual visit. It is also negotiated throughout the visit between the members of the family and it is challenged by the agenda of the Museum.

Issues that will be discussed in this chapter are: the profile of the family groups who took part in this study; their motivation for visiting the MSI and the Xperiment! Gallery in particular[2]; practical issues which they had to take into account before visiting; what the nature of Xperiment! exhibition is according to the family visitors; how they plan

[1] Which includes the educational, cultural and socio-economic background.

[2] Visitors' motivation for visiting the whole site was as important as their motivation for visiting the Xperiment! The discussion starts with visitors' reasons for visiting the MSI and their visit plans (sections 5.2 and 5.3) and then examines the visit at the Xperiment! exhibition in detail (sections 5.4 and 5.5).

their visit; and the personal and social context of the family Museum visit.

5.2 Family profile

Twenty-nine family groups were observed and then interviewed. In total there were 38 adults and one young adult, 25 of which were men and fourteen women[3] (table 5.1). The total number of children was 38: 21 girls and seventeen boys (table 5.2). There were 21 single-adult family groups, seventeen of which included men (table 5.3). Although there were more male than female adult visitors[4], the opposite was true for children visiting with their families. Although the difference was not significant, it suggests that girls are not discouraged from being interested in science, at least at a young age.

women	14
men	25
total	39

Table 5.1

Gender and number of the adult and young adult family members.

girls	21
boys	17
total	38

Table 5.2

Gender and number of the child family members.

women	4
men	17
total	21

Table 5.3

Single adult family groups.

In terms of visitors' age, three groups were over-represented in this research compared to the general population: adults between the ages of 35 and 44, adults of 55 years and above, and children from the age range 5-11 (tables 5.4 and 5.5). Among the latter group twenty out of the 27 children were from the age range 7-11 (primary school children)[5].

[3]This finding is supported by the MSI visitor demographic profile as described by the 1992 evaluation report (MSI, 1992b): male visitors outnumber female visitors by 56% to 44% (error +/- 5%).

[4]This is usual among visitors to science and technology museums.

[5]Similar findings were reported in two internal evaluation report documents (MSI, 1992a, 1992b) carried out by the Museum. In particular, it was noted that among adult age groups, the 35-44 year olds were over-represented compared to the general population. Also groups with children between the ages of 6 and

16-24	1
25-34	4
35-44	19
45-54	4
55+	11
total	39

Table 5.4

Number of the adult and young adult family visitors by age.

As table 5.6 shows, a bit less than half of the adult family members left full-time education before or right after completing the compulsory level[6]. Fewer people (9 adults) had a university education (first degree) and only five had a postgraduate degree. However, two adult family visitors were working on their doctorate thesis at the time of the interview. Looking at the first group of adult family visitors more closely, there seems to be a significant relation between their occupation and the subject of the Museum's exhibitions. Adult family visitors with minimum education were working or used to work in the industry or in the public transport sector.

0-4	6
5-11	27
12-15	5
total	38

Table 5.5

Number of child family visitors by age.

Educational background	
Minimum	16
Stayed on at school	3
Undergraduate degree	9
Postgraduate degree	5
Still in full-time education	3
NA	3
total	39

Table 5.6

Educational background of the adult and young adult family visitors.

10 were more likely to be frequent visitors of the MSI. This indicates that the family visitors in this study complies with the profile of the typical Museum visitor.

[6]No data concerning the visitors' educational background was provided by the Museum.

The socio-economic background of the adult family members who took part in this research was based on the groupings system devised by The Market Research Society[7] (1991). It seems (table 5.7) that a large number of adults belonged to the socio-economic groups B and C1[8]. There also were a number of people from groups C2 and from D. Only two people belonged in group A[9].

Status	Women	Men
A	0	2
B	2	7
C1	4	7
C2	1	4
D	3	2
Homemaker	1	0
NA	3	2

$N = 38$

Table 5.7

Adult family visitors by socio-economic status.

Thus, socio-economic groups B and C1 were over-represented compared to the general population. Indeed, the same groups (including group A) constitute the majority of adult Museum visitors in market research carried out by the MSI (1992a, 1992b). There were only two families from an ethnic background[10]. It appears that the family groups in this study are typical MSI visitors.

5.3 Socio-cultural patterns

This section discusses the motivation of family groups for visiting the Museum including the Xperiment! Gallery. Related to their motivation for visiting are the different ways the Museum was used by visitors in their social life. Furthermore, family visitors had to take into consideration a number of practical issues such as the weather, proximity and time

[7]This refers to socio-economic grading based upon occupation of the Head of the Household or of the Chief Income Earner. In this study, however, it was decided to form the occupation groups by gender of the family members. This was seen as a more sensitive approach since a lot of the family groups who participated in this study included single parents. Furthermore, during the pilot phase of the research it was felt that people were more comfortable stating what their own occupation was. See also discussion on page 7.

[8]This is in agreement with an MSI evaluation report (MSI, 1992b).

[9]However, according to the 1990 Visitor and Public Awareness Survey (in MSI, 1992b) and an MSI evaluation report (MSI, 1992b), socio-economic groups A, B and C1 constitute more than half of the adult MSI visitors.

[10]'White visitors constitute 89% of Museum's visitors, with an error of +/- 3%' (MSI, 1992b:15). This percentage is even larger among adult visitors (97%).

availability. Their plans about the visit revealed what kind of experience a Museum visit was and how it was perceived by family groups with different agendas and experiences. There seemed to be different agendas for the visit between family members of different ages and role, and between frequent and first-time family visitors.

5.3.1 Why visit the MSI?

Family groups choose to visit a museum during their leisure time where they expect a certain kind of experience. The choice of visiting the MSI in particular was based on its perceived place in social life. There were a number of different ways in which family members described their motivation for visiting the MSI. The vast majority of the family groups gave a number of reasons for visiting the Museum. The extracts below are typical examples of this point:

> M: Oh, we've come before, (...) to know more about it. We came together again probably about four years ago. It was close by as well – we live in Greater Manchester. A number of reasons, not one reason, yeah, it's a nice and interesting place to come. (F2, Q1)

> M: Right, ehm (...) basically, it was a day where we had nothing to do. The wife was working, it was possibly going to rain today so we wanted something that it was indoors.
> G1: And we've been before as well.
> M: I've been before as well. (F5, Q1)

Only five groups provided a single reason for visiting. However, the visit seemed to meet a number of unspoken expectations and needs implicitly linked to their decision. For example, the MSI was perceived as a good place to bring children as part of their education. It was also a place associated with the city of Manchester and its industrial history. In addition to this, it usually fitted well into the family's programme for a day out as it combines education and entertainment for the whole family.

In most cases (19 out of 29) it was an adult family member who answered the question on the reasons for visiting. It is likely that this happened because the adults were the decision makers. It also seemed that the children needed more time than the adults to warm up and start talking to the interviewer. It is possible that it was adults who usually were in control in situations like that and the children did not respond unless they were directly asked. Nine families responded as a group where family members shared their reasons for visiting. Only in one case did a 10 year old girl provide the reason for visiting on behalf of the group.

The reasons provided can fall into two general categories. These included the role the Museum is perceived by family groups to play in the social life – which is referred to as 'cultural itineraries' – and practical reasons.

Cultural itineraries

The term 'cultural itineraries' was originally used by Sharon Macdonald (1995) to denote 'a particular kind of list – one that proposes particular movements through space'. 'What is particularly analytically suggestive about the idea of lists and itineraries is that they make it possible to think about the motivations to visit the museum as both somehow slotting into wider sociocultural patterns – the idea of lists being somehow "out there" being evident in visitors' own articulations – as well as giving ample space for consideration of visitors' own strategies for compiling their own more individual lists or itineraries'(Macdonald 1995:16). Following Macdonald (1995:17), the term is used to refer to 'patterns that seem to emerge across the interview data rather than the more specific levels of each visitor group's own list'. The cultural itineraries are not exclusive. The motivation of the majority of the families for visiting the MSI can be understood in terms of such itineraries.

Five different itineraries were identified in this case study[11]. These were, according to frequency of occurrence: education; life cycle; entertainment; family event; and place[12]. The variety and co-occurrence of several itineraries shows that the incentive to visit the MSI is strong since the Museum caters for different aspects of a family's social life.

Education (24 out of 29 family groups). The education[13] itinerary can be divided into two categories. The first relates to a specific interest in the subject matter presented by the Museum exhibitions. The second refers to a more general interest in learning and educating one's own self – or 'opening one's mind' – through cultural activities such as museum visiting. A lot of family members also referred to the hands-on approach adopted by the exhibition team in the Xperiment! Gallery in order to communicate science and technology to its visitors. The hands-on approach was seen as facilitating children's learning.

One of the main reasons the families (20 groups) visited the MSI was because they were interested in the subject of the exhibitions, that is, science and technology. They were also interested in the interpretation employed by the Museum throughout its exhibitions (hands-on exhibits, working models and static exhibits). This was of interest to both adults and children. Adults seemed to be particularly interested in the themes covered by specific exhibitions related to their professional and personal interests, to their hobbies or to the fact that they regularly visited science museums and had developed a special interest. Subjects explicitly mentioned were aviation and its history, astronomy and industrial history. The following quotes are typical examples of this point:

[11]Some of them were in operation in Macdonald's study at the Science Museum, London. However, they were prioritised differently.

[12]Table 8.1 presents a summary of the cultural itineraries for all three institutions studied.

[13]This is also supported by the 1990 visitor survey (in MSI, 1992b). Education was one of the reasons the visitors chose to go to the Museum.

M: Yeah, something maybe that I didn't know and particularly with reference to things like astronomy maybe and space exploration. I'm a biologist, that's my thing. I teach at the Metropolitan University so the part of the no-biological science that interests me is astronomy. That's a kind of hobby so (...) but not a real hobby. It's not something I spend lots of time. It's just a vague interest I suppose. (F18, Q5)

M: I mean, I love at that sort of industrial machines and stuff myself. (F21, Q5)

M: They're just interesting and I'm particularly interested in aircrafts and aviation history and also I suppose I'm interested in industrial history as well (...). (F29, Q3)

Adults talking on behalf of the children in their charge, claimed that one of the reasons for visiting was the children's interest in science and technology or in how things work. They also referred to the children's inquisitiveness and said that they hoped that the visit would answer their questions. According to the adult family visitors, one way of achieving this was by giving children the opportunity to touch and experiment with things. Adults tended to relate children's interest in science and technology to science lessons at school and to previous visits to the MSI or other science museums. In one case, frequent visits to the MSI led the father of a 4 year old boy to discover his son's interest in train engines and develop it further through discussion:

M: Well, (...) I've found that he just wants to walk through the old exhibits to do with the train engines. We discuss a lot about them (...). (F29, Q3)

Children (in 9 out of the 24 groups) mentioned that they had planned to use the Museum as an educational source. Two of the children found it interesting that the Museum offers a variety of things on science and technology, such as the hands-on experiments and a whole range of trains, aeroplanes and cars. Another two mentioned that they were doing science at school and a visit to the MSI fitted in very well. Finally, one child stated that he wanted to use the Museum 'to pick up ideas' for a science project at school. Other reasons included the desire to see the aircrafts, to answer a specific scientific question ('when I was coming here I wanted to know how air could lift a car'), and 'to have a go at the experiments'.

Education or learning in general was stated explicitly as a motivation for visiting by many adult members of the groups. This is surprising considering the fact that the interviewer deliberately avoided the use of the term or any of its synonyms. It was predominantly adults who saw the visit in terms of general learning outcomes. The only child who used the term 'learning' was a 15 year old girl who claimed that the hands-on approach helped children learn about science and that it is the natural way for them to learn.

It is interesting to list some of the terms the adults used to refer to learning. These were 'education', 'knowledge', 'to know more', 'to learn/learning', 'get an insight', 'to

understand' and 'to explain'. They also refer to the Museum and the experience as being 'informative', 'educational' and part of the 'child's development'. The terms 'interesting' and 'interested' were often used (by 13 groups) to describe the Museum and the family members' attitude towards it and generally towards science[14]. Hence, the MSI was seen as a predominantly educational institution. Furthermore, it was a place where science learning becomes interesting. This is in contrast to Theme Parks which visitors considered to be just for entertainment and school where the learning process was considered to be boring:

> W: (...) we really enjoy it when we're here (...) and also learning. So it's educational, not just a Theme Park type-like place (...) so {it's} one of the best places to come. (F26, Q1)

Adult members of three family groups expressed the idea that learning is a process and that real understanding can only be gained through frequent visits to museums and the use of other sources. The following quote is an explicit example of this point:

> M: It's an accumulative thing really. We don't come here with any specific aims. I think every visit leaves a little bit more of an impression of how things work. So it's, ehm (...) a gradual thing; I never come with any particular project 'let's go and look at x or y and see how that works'. I think he gets more out of these things if he's exposed to it repeatedly. (F29, Q5)

Whatever their ideas about learning, it seemed that families visiting the MSI had a very strong agenda for using the Museum for educational purposes. They could either come with a specific learning aim in mind (for example to learn about or develop their interest in aeroplanes) or with a more general interest in educating themselves or in helping their children's education.

Life-cycle itinerary (22 out of 29 family groups) Adults seemed to view museum visiting as being part of their life-cycle. It was seen as a repeated activity which takes place at certain phases in one's life and it was usually related with childhood. Having been to the MSI before and enjoyed the experience was often a reason for wishing to visit again with members of the family. The desire to go to the Museum again was either associated with something that the whole family could do or with the children's interests. However, in some cases no further explanation was provided as if this was a strong motivation on its own right. The phrase 'we've been before anyway' was a typical response to the question why they visited. The MSI was perceived as being a familiar place, something from which family members knew what to expect and was a place to return to relive the experience.

[14]One of the results of one the Evaluation Report commissioned by the MSI (1992a) was that the most popular terms that visitors use to describe the Gallery were 'educational' and 'interesting'.

Adult family members seemed to think of museum visiting as something that one does at different stages in one's life, especially when one has children and again when one has grandchildren[15]. Visits to the Museum of Science and Industry were perceived as a significant resource for children's development, in particular for those of primary school age. The extracts below are typical examples:

W: Yes, our children saw the Museum so, you know, and this is our grandchild so it's kind of a nice day out really.
M: It's a history really, isn't it?
W: Yeah. (F28, Q7/9,C)

M: I think just show the children all about our industrial heritage really. (F6, Q5)

M: Well, I don't know really. I thought it might amuse him and might give him an idea what's (...). I mean I suppose children need to see these things, steam engines and things like that {laughter}. (F24, Q5)

There was also a nostalgic dimension particularly common among those family members who had been to the Museum before and had returned to see what was new; to show their children/grandchildren their favourite exhibits or explain to them how life used to be like by using the Museum exhibits. Some families returned to the Museum when their children were a bit older and could 'appreciate the things better'. The following extract is a particularly articulate expression of this point:

W: (...) I explained to her that my great-grandma lived in a house like that and my house was like that when I was young. And we went through all the rooms, didn't we? We've been in the 'cotton exhibition' this morning 'cause great-grandmother used to work on a loom and I've been explaining how many she had to look after. S. couldn't understand why you couldn't sit down and do it and I explained. You turn up and down to make sure that the cotton doesn't snap. It's all part of history there, isn't it?
{I: which exhibition do you refer to?}
W: There are separate rooms and it's being styled as the things we used to live with, like the small television and the washer. That wasn't electric all that, you know, and I was telling her which we had. I like that because she's very interested in history and I'd forgotten a lot of things. It helps your memory when you see them again. You think 'oh, yeah, that's how it used to be'. She's always asking what it was like. She can't understand it when I explain but when you see it there it's easier. (F10, Q1)

In the cases presented above the decision to visit the Museum was taken by the adult members of the groups. On the other hand, four family groups were prompted to visit the

[15]This repetition compulsion was quite significant in Macdonald's (1993) study as well.

Museum by a child who had been there before. Of course, this does not imply that the adults may not have had additional reasons for visiting. What is important here is that it was the children who originally expressed their wish to visit the MSI.

Entertainment (13 out of 29 family groups) Children's enjoyment was high on the agenda of the family groups. However, adults expected to enjoy themselves too. Parents and grandparents visiting with children seemed to have different attitudes. Although parents were concerned with the children's enjoyment, they also expected to enjoy at least some part of the visit themselves. On the other hand, there were two family groups consisting of grandparents who both said that the main source of enjoyment for them was the pleasure of being with their grandchildren. It is obviously the social part of the visit that they enjoy mostly.

Children seemed to find the Museum 'fun', they 'liked it' or it was their 'favourite' place. They usually referred to specific exhibitions or exhibits within the MSI, such as the Xperiment! Gallery and other hands-on exhibits spread throughout the Museum's galleries. Some of the children also mentioned that they enjoyed seeing favourite objects like trains and aeroplanes.

The majority of these families (10 out of the 13 groups) had been to the MSI before or had visited other science museums which they all enjoyed. Thus, having their previous visit as a point of reference, they expected to have an enjoyable visit experience. Adults in the majority of these groups (11 groups) seemed to think that there was no contradiction between having 'fun' and learning at the same time. On the contrary, it seemed that the Museum attracted them by not offering 'an either or' experience. The following quote is from a family group consisting of a man and his 6 year old son and is typical of this point:

> M: Well, it's fun and learning as well, isn't it? You know, it's good, it's good for him and I enjoy it in a way; I enjoy doing things as well. It's good for both of us. (F16, Q5)

Developing exhibitions which provide an enjoyable and learning experience is something that museums have recently started to do. There has been a long debate in the museum world about whether museums should entertain or educate their visitors. From what these families said it seems that a mixture of both is what best meets their needs.

Family event (9 out of 29 family groups) The museum experience was also seen in terms of a family event. It was a special family experience, a kind of 'routinised non-routine'. It was seen as one of the options families have when they want to spend time 'doing something together'. It was a 'day out' for the whole family, especially on occasions such as school holidays, weekends and special days in the family's programme:

M: She's got the day off school and it's just the matter of taking her somewhere of interest rather than playing with no interest. So it's something to keep her mind occupied. (F19, Q2)

M: He's been off school because of the half term and I'm off work on holiday (...) my wife had to go to work so I said I'd take them out somewhere, wherever they wanted and the decision was this Museum. (F1, Q1)

Indeed, having time off[16] was an important point for this itinerary. Free time for everyone was what made a day out into a special family event. The fact that the family could – if they wanted to – spend a whole day in the Museum or just a couple of hours increased the possibility of using the Museum on a number of different occasions. Doing something as a family was something that the children became accustomed to. They seemed to expect their parents or grandparents to take them to museums or other venues:

W: I think on a Saturday we try somewhere different each week because otherwise it's a dead morning {laughter}. They {grandchildren} expect us to take them somewhere each weekend and we've done it. (F7, Q5)

Children often were given the opportunity of choosing what they wanted to do. For the parents, it was an opportunity to spend time with their children who they did not see very often during the week. For the grandparents, it was a chance to see their grandchildren and renew their relationship. It was also necessary in the case of the families where the parents were working long hours. The family aspect of the experience was quite important for these family groups. This is supported by both Macdonald's (1993), White and Barry's (1986) and Hood's (1989 Wahkeena study) studies.

Place itinerary (7 out of 29 family groups) The place itinerary, as described by Macdonald (1993), comes into operation on several occasions including when family groups are on holidays or day trips or have guests. Hence, the place itinerary is characterised by a 'tendency to locate museum visiting within the framework of holidays or days out' or to classify museums among those 'venues which are presumably considered appropriate representations of the place'[17] (Macdonald, 1993:14). The place itinerary had a strong local dimension in the case of the MSI. The Museum building and its collections were perceived as an appropriate representation of the city of Manchester. The adult family members saw the transformation of the buildings from a goods warehouse or train station into a Museum; and the objects with which they used to work transformed into a Museum collection.

[16] A day out and school holidays were among the reasons given by the Museum visitors for visiting (in MSI, 1992b).

[17] In the cases where people who live locally have guests.

In four family groups, the adults referred to the Museum buildings and collections as being part of the town's history. They could still remember when the MSI opened and was housed in only one of the current buildings[18]. A man visiting with his granddaughter could remember part of the Museum when it was a goods warehouse. The following extract is quite a detailed account of his recollections:

> M: I can remember this place when it was a goods warehouse in the old days before the War, before 1940. This used to be a railway goods warehouse. Horses used to bring the goods here and cars used to take them out into the town. So I can remember this place when it was very old. And are you aware that this is the oldest railway station, used to be in the War? That's down at the bottom end. I can't remember the railway station as it was. I can remember it being a goods {warehouse}, yeah. If you go around the building you can see the way it's built; that old it is obviously. I remember the part where the engines are {Power Hall}. The trains used to come into there with all the goods and then open cars used to come in and take them into the town. I can remember that very much. It's a long time ago. And especially that one over there used to be an Exhibition Hall for the, some other things like City Hall. So I remember that as well. I can remember how it used to be before the War. Believe me it's changed now. (F19, Q12)

The Museum was also seen as a place to bring relatives who were visiting Manchester. For three family groups a visit to the MSI was on their list of things to do with visitors. In one of these groups, the family members split into two groups: the man and his nephew went to the MSI while his wife took her sister and niece to Granada Studio[19].

5.3.2 Practical issues

The practical side of the visit was taken into consideration during the planning of the visit. External factors such as weather[20], proximity to the Museum and time availability were among the issues considered.

Indeed, one of the reasons some family groups (5 out of 29) chose to visit the MSI was bad weather. They mentioned that they preferred to do indoor activities when it was cold or it was raining. Two of the families mentioned that they had a list of things they did when the weather was good and when it was not. For a man and his 4 year old son, the MSI was one of the 'favourite places when the weather isn't nice'. Part of the motivation

[18]This relates to Hood's (1989) finding where length of residence in the community where the museum is was identified as a main motivation for family museum visiting in the Toledo study.

[19]The choice was related not only to appropriate places to visit with visitors to Manchester but also to the gender of the family members. Going to a science museum was perceived as an appropriate place for men and boys.

[20]Bad weather in particular was one of the reasons the visitors gave for visiting during the 1990 visitor survey (MSI, 1992b).

for visiting for three families was the fact that the Museum was situated quite close to where they live.

A number of families (8 out of 29) mentioned that time played an important role in their decision to visit. Half of them visited the Museum to fill in time. It was a better option than sitting at home having nothing to do or going shopping for example. A couple of family groups had only a few hours free which they decided to spend at the MSI. In another two cases, one adult family member took the children to the Museum in order to give free time to the rest of the family.

In all of the above cases, practical issues were not the only reason for visiting the Museum. For all families who took part in this study, there was perhaps one dominant motive for visiting the MSI but never a single one.

5.3.3 Frequency of visiting

Ten of the family groups were visiting the MSI for the first time (table 5.8). Among these groups was a Canadian family who were in Manchester on holiday and a Chinese family who had recently moved to the UK. Both groups mentioned visiting museums in their own country. Also four more families mentioned that they had visited various museums in other cities in the UK. Only one family group had never been to a museum before. In a further five groups at least one member had visited the Museum before. In these cases two of the visits were made by children with their school, in two groups the adults had visited alone, and in another group the children had been with members of their family other than the ones they visited with on the day of the interview. Fourteen family groups had been to the MSI at least twice[21]. The majority had visited[22] the MSI or another science museum.

number of visits	number of family groups
first visit	10
repeat visit (regular visitors)	14
repeat visit (at least 1 family member been before)	5

Table 5.8

Frequency of visiting to the MSI in this study.

It is hard to distinguish any regular visiting patterns. Families with children between the ages of 7 and 11 seemed to be more likely to visit more often – as discussed in sections 5.3.1 and 5.3.1. This is the age group which was overrepresented and claimed to have been

[21]Three groups listed three times; one group four; another group five; and in two groups the family members had been at least nine times together the in last couple of years while in the other family the children had been about eight times with other family members.

[22]In the 1990 visitor survey, 44% of the respondents had visited before; this figure was 54% one year later (MSI, 1992b).

to the MSI or other science museums the most times.

5.3.4 When was the decision made?

The vast majority of the family groups referred to the MSI as being one of the places they wanted to visit for a long time. Ten groups specified that they had taken the decision to visit on the same day or the day before[23]. Only one group said that they had planned their visit to Manchester and to the MSI a few months before the visit.

5.3.5 Why the Xperiment! Gallery?

Fourteen out of the 29 family groups mentioned that they wanted to visit the Xperiment! Gallery in particular. In two cases visitors assumed they would find a hands-on exhibition in the MSI since they had seen similar ones in other science museums. Another group mentioned that they were pleasantly surprised to find Xperiment! Three more groups who were first time Museum visitors expected to be able to touch things.

More than two-thirds of the family groups mentioned that it was the hands-on exhibits that attracted them. This comment was made by both adults and children. The following quotes are typical examples of this point:

> M: I was keen to go to the top floor again, to the Xperiment!, because I remembered it from the last time. It was good wasn't it? The hands-on experiments were very good. I thought F. would enjoy it. Well, I enjoy it so I thought F. would {laughter}. I thought it would be a good place to start. (F2, Q3)

> G: I just wanted to have a go on these experiments. I like that bubble thing that makes the bubbles and all the colours. (F14, Q4)

> G1+G2:// Well, we wanted to go to
> G1: //the Xperiment!
> G2: //Yeah
> G1: //But there're lots of things
> F: //Shall we try one at a time? J., what did you want to do especially?
> G1: I really wanted to go and play where all these games are like children holding hands {shake hands}.
> G2: I wanted to go and do things like stop things and make things. (F18, Q3)

The importance of the hands-on aspect[24] of a museum on its image has also been indicated by Macdonald's study (1993) at the Science Museum, London.

[23] The same finding was reported by the 1990 visitor survey (MSI, 1992b).

[24] According to Porter (1996), multisensory experiences were what the MSI public said that they wanted to find in the Museum.

5.3.6 Visit plans

This refers to visitors' movements through the exhibition space. The information on this subject came from the part of the interview where family members were asked whether they made any preparations for the visit, and whether they had any specific plans for things to do or see in the MSI. Based on the families' visit plans, three types of family agendas were identified: open, flexible and fixed.

(a) Families with open agenda Ten family groups mentioned that they wanted to see all of the Museum or as much as possible. Although there were certain things that they would expect from their visit, they were more likely to be influenced by the agenda of the Museum than family groups with flexible or fixed agendas. All family members in this category were first time visitors. Two of the families referred to their experience as 'browsing' through the Museum's exhibitions, picking what interested them most. What is particularly interesting here is the way visitors described their movements:

> M: Yeah, but we just wanted to see it all; to see what was going on; first to see and then (...) we'll just carry on what takes our interest we'll just have a look at (...) we're going to just travel through the best way we can {laughter}. (F7, Q3)

> W: We just follow and go step by step to see what's inside and if we're interested in something we'll stay there for long time and if we're not interested we'll just pass by. (F15, Q3)

They seemed to think of themselves as doing a superficial reading of the exhibitions, paying attention only to the things that interested them. Family groups at the Food for Thought Gallery in the Science Museum in London seemed to have a similar attitude (Macdonald, 1993). In Macdonald's study, however, this was true for the majority of the visitors. This type of behaviour could be a mechanism of first time visitors in order to meet their needs and expectations rather than just being passive receivers of the Museum agenda. Thus, it could be said that they do not have a 'Museum specific' agenda – one that refers to activities connected with this particular Museum – but they have a more general set of needs, desires and expectations which they want to fulfil during their visit. As the visit proceeded, they were able to orient themselves and started developing a general idea about what was available and what they would prefer to do. The visit plan of the families with open agenda was negotiated among family members throughout the visit. This is a typical example of how the decision making took place:

> W: We looked at the map they gave us and tried to decide what we wanted to see but (...) we didn't decide anything; we just thought just walk up the stairs {laughter} and see what we are going to do so we didn't know. That {Xperiment!} was the first thing we did; we've just arrived. We didn't know that we would end up there. We

thought that there might be something on this floor (...) but there was nothing until we ended up there {laughter}.
{I: what do you want to do next?}
G: I don't know.
W: Well, I would like to go and see the Air and Space Gallery right away; he {refers to her husband} wants to go to the Power Hall, so we may split. We haven't decided yet. (F8, Q3)

One of the above groups had followed a certain route through the Museum space. They used the Museum Guide which allowed them to see it all. The adults' main concern was that themselves and their granddaughter could see all of the Museum's exhibitions. This is a good example of where a family group accepted the Museum agenda since it met their own needs. Another family described their visit as an exploratory visit which they would use for future reference. In this case, a man with his 15 year old daughter visited the Museum in order to decide if it is worth visiting with the rest of his family – especially with his younger children.

(b) Families with flexible agenda Fourteen families took a different approach to their visit. Families with flexible agenda had been to the Museum before – or at least some of their members had – and were familiar with the place. They seemed to have had a clearer idea about what they wanted to do or to see and to have drawn up a plan including which exhibitions they would or would not like to see. However, this was quite a flexible plan which could be revised during the visit according to the family's priorities. Families in this category seemed to be willing to fit into their 'visit list' new things offered by the Museum that might interest members of their family. Thus, they appeared to be open to influences from the Museum agenda as long as it met their needs.

In most cases, planning the visit was a responsibility shared between family members. There were some families (6 groups) where the adults let the children decide what they wanted to see in the Museum. Adults in these groups did have preferences but their priority was to please the children first and give them the opportunity to express their wishes. Thus, all family members had equal opportunities in drawing the plan of the visit. This meant that they had to negotiate their agendas for the visit. The following quote is from a man visiting with his 5 year old daughter and her friend (same age) who had been to the Museum before with school:

M: These two knew how to go around inside the Museum as well. They remembered the location of things in the Museum very well. They told me what they wanted to come and see and where it was inside the Museum. (F18, Q2)

He then went on to say that one of the things he would like to do was to see objects relevant to his hobby of astronomy. Thus, they would try to visit the Air and Space Gallery.

There was one case where the negotiation was not quite successful where the agendas of the adult and the children were contradictory. The children wanted to stay in Xperiment! longer while the adult wanted them to move on so that he could have a cigarette and then visit the Air and Space Gallery. The adult's main reason for visiting was to spend some time with his children[25]. He did not seem particularly interested in Xperiment! which was exceptionally busy that day. He also was a heavy smoker and there was no smoking space anywhere in the Museum. He seemed particularly frustrated and he smoked throughout the interview. On the other hand, his 11 year old son had been to the MSI with school and enjoyed Xperiment! very much. Thus, he wanted to go back and see some of the exhibits he did not have the chance to use last time and try his favourite ones again.

Two groups mentioned that at the beginning of the visit they were more likely to be influenced by the agenda of the Museum[26]. Thus, the first gallery visited was the one nearest the entrance. This gave them a little bit of time to plan their next movements.

For most of the family groups in this category seeing new exhibitions or exhibits made a pleasant change. This is why a lot of them returned to the Museum and it was a chance for the Museum to influence the agenda of the group:

> M: I think, you know, the idea is because she likes to come here (...) there's always something added to the Museum and if it's something she hasn't seen before that's good. We'll go round the whole Museum and we'll see if there's anything new in the other parts as well. (F19, Q4)

> M: (...) well, it's years since I was in there so I want to go in there again and see what changes there is, you know, I'd like to walk in there and J. hasn't been there.
> B: No. (F9, Q3)

A number of families (4 groups) referred to the fact that their route through the Museum exhibitions can be dictated or altered by crowded conditions. It could also be a reason to return to the Museum when it is not so busy. They generally preferred it when it was quiet because they had the opportunity to use the exhibits freely and for as long as they liked, and also to talk to each other. The following extract is typical of this point:

> W: I think because possibly we want to avoid the crowds we would go where it is quiet so we could talk to each other and, you know, we prefer it a bit quiet. (F10, Q2)

(c) Families with fixed agenda This category is the smallest of the three and consists of three family groups. It includes frequent visitors only. All members of the families had been to the MSI many times[27] together over the last couple of years. They

[25]He mentioned being away from home for long periods of time because of his work.
[26]This includes its physical characteristics.
[27]Nine, five and four times respectively.

knew the Museum very well and also what the other members in their groups wanted to do. Two of the families had a list of galleries which they visited every time in almost the same order. The first quote is from a man with his 4 year old son and the second one from a woman and her 10 year old daughter:

M: We always come round the Xperiment! place first and then we always go in the Steam Gallery {refers to the Power Hall Gallery} and finish in the Air and Space Gallery, don't we?
{I: do you ever visit other Galleries?}
M: We do sometimes, not always. It depends on concentration level. If his enthusiasm is still there we do but more often we don't. Well, a short trip in here {Xperiment!} then over to the Steam Gallery and then we go to see the aeroplane but, occasionally, we do go down to the tunnel, don't we?
B: Mmm.
M: And we've found the old engines and the Electricity place.
B: Yeah. (F29, Q3)

W: First thing each time {we visit Xperiment!} Next we're going to the cafe to have some coffee.
G: Either Gas or Electricity or the Space.
W: We've been to Gas and Electricity, haven't we?
G: Yeah. (F17, Q3)

The other family with four members[28] usually spend the whole day in the Museum trying to do as much as possible. They usually start with the exhibitions near the main entrance and finish with the building at the bottom of the Museum:

W: We're usually here for about five hours {laughter} and they try everything and they want to see everything usually. I mean, she doesn't remember most of it but C. does. It's a little bit stuck in your mind the atmosphere in the Sewer and the smell//
M: //The first time we came//
W: //We missed like a few things the first time, didn't we?
M: I think it wasn't the fact that we didn't notice it. There was plenty of time to decide where to go and what to do. It was just taking it all at once.
W: Each time we come we've fitted more and more in because we know where we're going next. You know, you sort out the route in your head, you know, when you just arrive.
{I: what have you planned to do next?}
W: Go to the Power Hall.
M: Down to the exhibits at the bottom, yeah. (F26, Q12)

[28]Woman, man with son and daughter aged of 10 and 5 years old respectively.

In the last case, the visit is planned when the family arrives at the Museum and it includes visiting the whole site. For the first family the plan is already decided and has been tried out by its members many times in the past. In the case of the second family, they always visit the Xperiment! Gallery first but the rest of the visit is planned on the same day through a process of elimination[29]. Perhaps the need of the third family to see the whole Museum each time relates to the fact it is the largest group where its members have different needs. It was important that they all find something interesting to do.

The recollections the third family group (see F26) had of their first visit to the MSI described explicitly the stages through which these family visitors passed before they became familiar with a museum space and were able to plan their visit according to their agenda. It is a process through which the visitors' agenda is refined and redefined through its interaction with the Museum agenda. Family members had discovered what the museum could offer them and knew what to expect. They were also able to draw up a plan – a set of movements through the museum space and time – which expressed their agenda. A similar comment on this issue came from a family who were frequent science museum visitors but had never visited the MSI. Although they had previous experience with science museums, they were not able to plan which exhibitions they wanted to visit:

> W: If we knew the Museum we would know where we wanted to go like on a repeat visit. If we were to live here and come here many times. (F8, Q12)

It is very interesting that all three groups in this category had a very strong agenda for learning. Furthermore, they described learning as a process. Learning is an 'accumulative experience' where every visit adds to the experience and is 'stuck in the children's mind'. The Museum was perceived as an educational institution. It is a place where they learn about things that interest them and which can combine both fun (without being 'a theme park-type like place') and learning (without being boring like school).

5.4 The context of the visit

One of the objectives in carrying out this type of research was to study visitors' own accounts of their expectations of what the visit will hold, both as individuals and as part of the family group. There is a distinct difference between adults' and children's expectations. Although the personal and social context of the visit cannot be separated, they are discussed in different sections here for practical reasons only.

[29] For example, by excluding the galleries they do not like and the ones they had visited recently.

5.4.1 The personal context

The personal context of the visit is defined not only by each family member as an individual. It is also influenced by the museum[30] and by the social context of the visit – the other members of the group. The personal context can best be defined as the 'personal reservoir of knowledge, attitudes and experience' and expectations of the visitor.

What do family members hope to find in the Museum? What are adults' and children's expectations for the experience? These are some of the issues to be explored in this section.

Visitors' expectations What family members expected to find or to do in the Museum seemed to be closely related to their previous museum experience. This includes previous visits to the MSI or other science and technology museums. These are also factors which, together with age, seemed to affect the personal context of the visit to the MSI. Since family groups come to an exhibition bringing with them physical and intellectual needs, expectations, ideas and preconceptions, these inevitably affect the nature of their visit and their responses to it.

Children seemed to have different expectations from those of the adults – or at least they articulated them in different ways. Again children who had been to the MSI before had quite specific expectations compared to those who had not visited. One should not forget that the expectations of family members were also influenced by what they had seen in the MSI[31] on the day of the visit. Discussions with other family members or friends of the family who had been before was also a source of influence. General interest or hobbies was yet another influencing factor especially for adult visitors.

(a) Child visitors in family groups Children expressed their expectations in terms of their personal needs only. They did not speak on behalf of other members of their family as adult family members usually did.

Children in 23 of the 29 groups specified what their expectations were. Twelve children had object-specific expectations, relating to particular exhibits. Xperiment! was often mentioned:

> B: Because my mum works in the trains and so I (...) wanted to see the older trains and then the new ones to see what they look like. (F4, Q3)

> G1: I expected to see the Hot Air Balloon. (F18, Q4)

> G: I just wanted to have a go on these experiments. I like that bubble thing that makes the bubbles and all the colours. (F14, Q4)

The vast majority of these children had visited the Museum many times before[32]. Children in eight family groups mentioned that they particularly wanted to visit Xperi-

[30] The subject matter, media of communication and physical characteristics.

[31] Other exhibitions visited and printed material.

[32] Some of them had been more than three times recently and remembered the Museum very well.

ment! or specific exhibits within it. There were two groups where only the adults had been and they discussed what they saw. In these cases, the expectations of the children were influenced by the discussion.

The rest of the children seemed to have more general expectations about what they wanted to do in the Museum. These included being able to 'touch things', to 'make things', to find thing that are interesting, to learn how to make engine models and to be able to do 'lots of things'. Only a 7 year old boy did not know what to expect and had never been to a museum before. Finally, an 11 year old girl expected the Museum to be really good because 'otherwise dad wouldn't want us to go again'. She had been to the Museum before with her family but was too young to remember it.

There were two cases where the agenda of the children was indicated in terms of what they did not expect to find in the Museum as compared with their previous museum experience. Having been to a science museum in his home town many times, an 8 year old boy was impressed by the amount of exhibits in Xperiment! A 13 year old girl was amazed by the fact that the Museum – especially Xperiment! Gallery – was 'so bright', 'so colourful'. On prompting, she admitted that she expected to find 'dull things'. Her brother (15 years old) nodded in agreement and he added that in Xperiment! there are:

B: Strange things that you don't know about, new things like what//
G: //Like the one which lets the sun through with all the different beams. (F7, Q4)

In another case two 5 year old girls gave their version of what they expected 'a place called science museum' to be like:

G2: Well, lots of things that have happened and don't happen any more.
M: History of science.
G2: Yeah, like people who (...)
G1: Who lived in the past and they died.
G2: Yeah, but now they're dead. (F18, Q4)

It seems that children in family groups had an agenda for the visit which was very closely related to their previous visits to the same Museum and, to a smaller degree, to other museums. In four cases only, children related their agenda to other factors such as science and biology lessons at school, to hobbies and family history. For example, a 6 year old boy wanted to see old and contemporary trains because his mother worked with trains.

(b) Adult visitors in family groups Adults' expectations of what the visit would hold were more subject-specific, relating to the theme of the Museum or the exhibition. They were influenced by previous visits to the MSI and similar museums. Very often they

referred to what they expected their children to gain from the visit[33]. They perceived museums as being educational institutions which could provide them with concrete examples of ideas or concepts. The adults' ideas of learning in a social setting such as a museum and the adults' role in the educational process were closely related to Vygotsky's (Moll, 1995) notion of 'the zone of proximal development'.

The vast majority of the adult family members[34] seemed to have a subject-specific agenda. They expect to see exhibits like aeroplanes, steam engines, trains, that is exhibits related to science, to the history of science and to industry. Adults in eight groups associated their expectations with their general interests, hobbies or work. Here are a few typical examples of this point:

> M: I've always been interested in the industrial archaeology side of it, you know, like the transport, the engines that sort of things. So I'm always looking for any new things they've got here. (F5, Q5)

> W1: I wanted to see different ways of explaining science for children. {She is a school teacher in India} but in Xperiment! they can observe the experiment and understand it much before they can read it. I asked him 'have you done the experiment?', he says 'no', I said 'do you understand it?', he says 'yes (...) I did read the first line and experimented and then I know the rest'. It's a new approach to learning science that's what it is. (F25, Q5)

One adult family visitor who was an engineer mentioned that the fact that he saw machines everyday made him reluctant to visit a science museum in his free time. However, he seemed to believe that visits to science museums were part of his 11 year old daughter's education. This was also how a couple of scientists[35] viewed their visit to the Museum. They expected the MSI to offer 'basic science knowledge for children'.

Half of the first-time adult visitors (5 of the 10 groups) referred to their need to learn how things around them work. More mentioned that they brought their children for the same reason. They saw the Museum as a training resource for adults and as something which added to the children's education. They particularly referred to the media of communication that the Museums employs which are different to the traditional ones (books for example) and to the ones employed by school. This is a particularly explicit example:

> {I: what did you expect to gain from you visit?}
> M: Oh, a sort of an insight into how certain things work. (...) It's often very difficult to look at a textbook and try imagine why something is working//

[33] Adults in fifteen groups admitted that they had mainly visited for the children. Half of the adults were grandparents.

[34] Both among first-time and frequent visitors.

[35] They were doing their doctorate research at the time of the interview.

G: //Yeah
M: //you know, from the written words but when you see it, ehm, it might still be difficult to understand why it works, but at least you see the physical aspect of the experiment of the motion or whatever. So from the point of view that really you are, ehm, taking something out of a book and showing it to someone or touching it or understanding how it works through physical sense, yes? That's, I think, one of the things I would expect to, ehm, come out with this but I didn't know that this {Xperiment!} was here so it was a complete surprise for myself.
G: It's just that you understand things when you see them like that; it's not like reading about them from a textbook.
M: Mmm!
G: It makes a change. (F11, Q5)

One of the adults found intriguing that the Museum could give answers to 'things that happen around you and really surprise you how does it happen'. This is an example of an effective match between the agenda of this family visitor and that of the Museum.

Although a number of adults (15 groups), including parents, grandparents and other relatives, admitted that they visited the Museum mainly for the children, it was groups consisting of grandparents only who did not seem to have any personal expectations of the visit. The only exception to that was a group where grandparents were not the only adult members. They were invited to follow the family (their daughter with her 8 year old son) to the Museum. Thus, the dynamics of the group were quite different. One of the parents was there and most of the interaction took place between her and her own parents. The grandparents also had a special interest in the Museum's medical collection and expected to see on display some objects which they had donated. They were also interested in exhibitions about the city of Manchester and its history because they came from there originally. These aspects of their agenda may have been more important in this case.

Grandparents in all eight groups were surprised even at being asked about their personal expectations. They said they did not have any. Others said that they had not thought about it because they only came for their grandchildren. They all agreed that the visit was just an occasion of being with their grandchildren and enjoying their company. The following extract is a particularly explicit example of this point:

M: For me! Just the pleasure of being with her. It keeps me a bit younger {laughter}. {...} Well, if she enjoys it I enjoy it obviously. I wouldn't bring her if I didn't think she'd enjoy it. And she also enjoyed the Museum at the other side {Air and Space Gallery}. I think that's because you're doing the War at school, isn't it?
G: Yes.

M: She's still doing that at school so obviously that's an interest and the fact that I was at the Navy is an interest as well, you see, for her. Well, the thing is I find that with children if there's somebody older with them that has experienced things, for instance the Museum down to the Sewers place, well, I've experienced that when I was a little boy. So it's interesting for them if you can explain to them. It's better than all the works if somebody is there to explain to them. (F19, Q5)

This is a good example of a grandparent addressing his social agenda and also sharing his personal experiences with his granddaughter[36].

Factors influencing the personal agenda The personal context of the visit and the navigations through the Museum exhibitions highlighted the significance of previous museum experience for a variety of family groups in planning their visit. It is a step towards understanding the way family members' agendas are shaped and refined. What visitors know about the Museum for previous visits and, to an extent, from visits to other similar institutions influence their expectations. The formation of expectations is a dynamic process. Visitors define and refine their expectations according to what they see and do in the Museum or, in the case of first-time visitors, what they hear about the Museum from other sources.

There seemed to be a significant difference between first-time and frequent visitors in terms of the personal agenda of family members – both children and adults – and the way they planned their visit. There were further distinctions between families who had been to the Museum a couple of times or those who were frequent Museum visitors. The gap seemed to be even bigger in the case of the children who had previously visited the Museum and those who had not. Children were much less likely than adults to have seen a leaflet and none mentioned having heard about the Museum from other sources. Also their experience with visits to other museums was limited due to their age and their ability to remember and generalise from previous museum visits. In this respect, adults (and some of the teenagers) were more likely to utilise their previous experience and have some general expectations about their visit and to adjust their visit plans according to them once the arrived in the Museum. This may be one of the reasons why a lot of first-time adult visitors to the MSI had subject-specific expectations.

Finally, almost half of the adults (in 8 groups) who had visited for the first time mentioned that written material (leaflets, map) had played an important role in the creation of their expectation as they entered the Museum. One family said that it was the introductory exhibits and the discussion with a member of staff that gave them an idea of what was there and made them expect certain things. They often referred to their previous experience of visiting science museums to explain the fact that they knew what to expect from a science museum. Thus, as soon as they had some information on the titles and

[36]This point will be further discussed in section 5.4.2.

themes of the exhibitions, they would expect to find relevant exhibits. This made the decision as to which exhibitions to visit easier for them. Another couple mentioned that they did not expect to be able to touch the exhibits in the Xperiment! Gallery until they watched other visitors doing so[37].

5.4.2 The social context

Families come to the Museum as part of a social group. The place of the MSI on the cultural itineraries, which was discussed above, is the first step towards understanding people's motivation for visiting with their family. The personal context of the visit revealed an aspect of the family members' concerns about their visit. More specifically, adult family members seemed to perceive the Museum as a place which appears on a number of cultural itineraries of significance to them. The most popular one seemed to be the education itinerary. Thus, the vast majority of adults were concerned with their children's and their own educational experiences. On the other hand, children's concerns were more object-specific. They were more interested in seeing specific exhibits in the Museum or doing specific activities in Xperiment! which they remembered or enjoyed doing last time they visited.

As already noted, a large number of adult family members (15 groups) visited the MSI for their children's sake. More (24 groups) expressed their concern about their children's educational experience. The adult members of most of these groups expressed their intention to influence their children's educational experience through the exhibits. This attitude was stronger among parents than grandparents or other relatives the children visited with. Yet, there were individual differences among family groups consisting of parents. This intentional effort of adult family members to influence children's educational experiences through an informal educational situation is called 'enculturation'. The term and its definition are adapted from Moll (1995).

Children's social agenda Children in fourteen groups referred to the fact that they had been to the MSI before with their family and wanted to visit again. Six of these groups seemed to have visited the MSI and the Xperiment! Gallery in particular on the children's request. Although the child family visitors in all three institutions did not seemed to be particularly concerned with the social aspect of the visit, there is strong evidence that they did want to share the visit experience with their family.

Adults' social agenda It became obvious that the social aspect of the visit was important for adults. A number of adults (11 groups) especially mentioned that they had been to the MSI before with their family. The family aspect of the experience was important for these groups.

[37]This relates to Bandura's (in Vasta et al 1992) idea of learning that results from imitating a model.

As noted above, the social aspect of the visit was important for grandparents in particular. They also seemed to focus more on the social history portrayed in the exhibitions rather than on the science or technology side of it. The emphasis was on things that grandparents themselves or members of their family had experienced. Seeing the Museum exhibits actually gave grandparents the chance to relive an experience and to transfer biographical information or information on family history to their grandchildren. This seemed to make them quite proud and nostalgic at the same time. It seemed to be extremely significant for them to be able to talk with their grandchildren about what they saw in the Museum and to explain to them how things used to be. Grandparents in five groups referred to their need to 'explain' to the children how the Museum objects used to be part of people's lives and experiences:

W: It was during the War, you know, and some of the aeroplanes were out during the War. I was born in 1933 so much of that thing is not new (...) I was at school, school-age, when that was happening and the War was on. I was telling him about that when I was showing you that picture, didn't I?
B: Yeah.
W: I come from Staffordshire and (...) it's like a big factory and (...) they were dropping bombs during the War and they dropped one but it didn't explode. So he asked me why it didn't go off. Well, I said 'it just didn't' (...) I don't think he can grasp it, you know, what I mean. It's so many years ago. (F4, Q5)

For one of the groups, going out with the grandchildren every Saturday morning was a family tradition, a ritual. Their grandchildren expected them to arrange something to do, a 'project' as they called it. This couple took tremendous pride in the fact that their grandchildren aged 16 and 13 still wanted to spend time with them.

Enculturation Parents seemed to be concerned more with exposing their children to an environment where they could learn about science and technology rather than family history. They seemed to see the visit as an opportunity for their children to learn about their environment and to introduce them to the practices of the society in which they live. The following extracts are typical examples:

M: (...) to get a bit of knowledge if you can while you're here but mainly to give the kids a treat, you know, bring them down. S. wanted to come down here, he suggested it this morning actually and give him a taste of what's in the world really. (F1, Q5)

M: I think just show the children all about our industrial heritage really from steam engines, I hope we'll see them, ehm, (...). (F6, Q5)

M: Ehm, just a basic insight, a basic learning process. My daughter has never seen an aeroplane, you see. (F20, Q5)

The language the adults in the above cases use is another interesting point. Phrases like 'bring them down', 'give him a taste', 'show' implies their intention to modify their children's thinking directly. A number of parents (11 groups) referred to their children's desire to learn about things. Children – according to parents – kept asking them questions about how things around them worked or showed a special interest in science:

> M: He's been here with the school, you see, and with his uncle. He's very interested in science and technology and things like that. (F9, Q1)

> M: Because E. is really interested in science anyway at school so I said 'well, let's go to the Museum and have a good look round at different things' and she's quite interested in science and electrical thing and stuff like that, aren't you?
> G: Yeah. (F14, Q1)

Parents wanted to develop interests further or create them for their children by using the MSI and other institutions as means of assisting that special socialisation process:

> M: We went to the Transport Museum the other week in London (...) They enjoyed that and A. at the moment is particularly interested in aeroplanes having had a couple of books for Christmas which showed you aeroplanes, trains (...). (F6, Q5)

> M: Generally speaking I think we've seen in museums – we do go to quite a few particularly in London – but there are more nowadays where children are able to push buttons and just join in with the exhibits. And we're not a particularly scientific family so we have to work very hard at it. (F6, Q10)

With this concludes the presentation on the families' ideas about their Museum visit.

5.5 The exhibition

One of the interests in carrying out a qualitative study of this type was in family members' reconstruction of their visit to a hands-on exhibition and in how this relates to the family agenda.

As seen in the previous section, both adults and children bring their personal and social agendas to the museum visit. It is also true that 'the museum environment itself provides a social context for the visitor; the staff and the volunteers who work with groups are part of that social context, as are other museum visitors with whom a group might interact' (Falk and Dierking, 1992:41). How are the personal and social agendas of the family group manifested during the visit? How is it affected by the Museum environment and the theme of the exhibitions? How does the visit influence the development of the family agenda? These are some of the issues which will be explored in the following sections.

5.5.1 Families in Xperiment!

The vast majority of the families observed arrived at the exhibition via the ramp. Only a couple of them used the lift[38]. Nineteen out of the 29 families turned left as they entered the exhibition[39] and nine turned right. Only in one family group the members separated, some turned left and others turned right. In fourteen groups the family members stayed together throughout the visit or separated for a few minutes occasionally. Although the family members in the rest twelve groups went on different exhibits mainly, they stayed in the same areas more or less. Younger children always joined an adult or an older child in the group and usually determined the pace of the rest of the family, due to their short concentration span. Sixteen of the 29 groups used more than half of the exhibits[40] and thirteen of them used less than half.

The vast majority of the family groups looked around and then approached one of the exhibits located closest to the entrance of the exhibition. It was usually a child who made the choice and the adults soon followed. However, in the case of the families who did not separate, it seemed that, although the children had control over the time spent interacting with an exhibit, the actual route was more or less determined by the adults. The adults made sure that the family would go round the exhibition seeing most of the exhibits, paying more attention to some than to others. The physical characteristics of the exhibition seemed to determine those alternative routes. Hence, the vast majority of the family visitors were observed working their way around the exhibition very systematically, going from the first to the second and then the third area and coming back to the first area. Of course there were many variations of this route as the needs and wishes of the members of the family were being negotiated, family members returned to see favourite exhibits or their choices were restricted by other visitors (who competed for use of the same exhibits).

The above behaviour was more evident in those family groups where the adult had a very strong learning agenda. Influencing the children's educational experience was important for these adults. They were all parents (10 groups) and adopted the role of the 'educator' throughout the visit[41]. This type of behaviour seemed to be related to the age of the children as the vast majority of them were aged between 6 and 8. In two case there were children as young as 4 and in one family as old as 10. However, adult family members (both parents and grandparents in 14 groups) accompanying older children (9 to 13 years old) seemed to engage in discussions with the latter. Of course, they helped or explained things to them when they needed to but the interaction was on more equal terms. In a couple of family groups, it was a child who showed and explained the exhibits

[38]Refer to the plan of Xperiment! exhibition in Appendix A.

[39]The area on the left is actually where the vast majority of the exhibits are located.

[40]In total, there were 57 exhibits.

[41]The following description is based on the analysis of the observation and questionnaire data. A classification of observed behaviour as defined in Appendix B can be found in Appendix C.

to the adults and the other children. In both cases, the children had been before quite a few times (3 and 8 times within the last couple of years) with other family members and/or with school.

Apart from a few cases, whenever sub-groups were formed they seemed to consist of an adult and a child even in cases where there were more than one children in the group. It seems that children, especially young ones, needed an adult's support to work the exhibits and understand what they are about. The presence of an adult also seemed to regulate children's 'touch-and-go' behaviour and, instead, they stayed longer at the exhibits. Adult family members used all available resources in their attempt to interpret the exhibition to child (and other adult) family members. Adults in all but two family groups read labels aloud (or read them and then 'interpreted' them); exchanged information about the exhibits[42]; and talked about them, pointing at different parts. The following quotes are typical examples of verbal exchanges between family members: (children's' questions about the exhibits) 'What is it?', 'What's doing?' 'How does this one work?'; (teaching a child to think scientifically) 'Have a look from the side. Which one do you think will get at the bottom first?', 'Why does it do that? Feel it!', 'What's going to happen? Look!', 'Guess what's going to happen to this one before you do it', 'Some magnets pull each other and some others stay together, see?'; (a child changes some parameters of the exhibit to see what happens) 'Can you still see me?'; (mediating knowledge) 'Dad, I know how to do that [...]'; (giving instructions and focusing one's attention) 'Press the button down. Come on, press it down and hold it. See all the paper here, see how the water warms?'

Some adults seemed to prefer watching other family members interacting with the exhibits. In these cases, they would adopt an observer's role or they would try to share different types of interaction. For example, the adult might read the instructions or explain how the exhibit works while pointing at different parts and supervising the child who tries to work it. These types of family interactions were often accompanied by demonstrations of affection (25 of 29 families) such as embracing, smiling or cuddling. In only four family groups, signs of aggressive behaviour were observed. This was expressed verbally[43] or physically[44].

None of the family groups were observed interacting with any of the explainers[45]. They often watched other Museum visitors interacting with the exhibits (adults in 26 groups and children in 28 groups). However, only rarely did they speak to them (5 adult and 3 child family members).

The visit was some times interrupted by the physical needs of the family: going to the

[42] Adults in all family groups.

[43] An adult who wanted to leave the exhibition argued with his sons who wanted to stay longer.

[44] A 5 year old child who was frightened by the exhibition was pulling and pushing his grandmother in his effort to make her leave.

[45] Only in one case did a family member ask one of the explainers where they could have lunch. Later during the interview she mentioned that she thought he was one of the cleaners.

toilet (6 families), having a rest (4 families), having something to eat or drink (4 families). The vast majority of the family groups seemed to be concerned with the physical aspect of the exhibition. They especially wanted to look over the balcony at the ground floor of the building. This usually happened towards the end of the visit.

Time spent in the exhibition The average time spent in the exhibition was 40 minutes with a maximum of 1 hour and 10 minutes and a minimum of 10 minutes (table 5.9). Eight families spent less than 30 minutes, twenty families spent from 31 to 60 minutes and only one spent more than 60 minutes in Xperiment!

minutes	number of family groups
≤ 30	8
31-60	20
≥ 61	1

Table 5.9

Time spent in Xperiment!

Hence, most of the family groups invested quite some time in the exhibition.

5.5.2 The nature of the exhibition

Many adult family members made comments about the nature of Xperiment! as an exhibition. These came mainly in response to the questions 'Which exhibits did you use' and 'What did you like the best'. More than anything else, they commented on the educational nature of the exhibition as a whole or by referring to specific exhibits. This was a particularly important aspect of the exhibition for all family visitors[46]. A small number of adult family members (6 people in 6 different groups) referred to the idea of learning by doing and having fun which was thought to be particularly important for children:

> M: I mean, these things are just to illustrate principles, aren't they. That's the idea to sort of learn by fun. That's really what's about, isn't it? (F16, Q10)

> M: They all look pretty the same to me. It's just an insight, these {refers to his daughter and son} (...) ehm, it's educational because you can actually do something and see the results. (F20, Q7/9, C)

Most of the adult family members (17 people) mentioned the fact that the exhibits in Xperiment! illustrate scientific principles to which children should be introduced. They also referred to the fact that they could repeat the experiments and observe what happens. Some of them admitted that it was not only the children who could profit from this. There was again an emphasis on the 'doing' aspect of the exhibition:

[46] For first-time and frequent visitors alike.

M: I liked that one {spin me}. I thought it was very effective (...) that was when you pulled the ball – the faster rotation the smaller radius on the ball. That's all, I thought. I liked the explanation. It said it was like the ice skater. You could do it yourself very easily and quickly – quite a dramatic demonstration, simple but very effective. I liked that. (F2, Q7-9/A)

M: It's quite fascinating that {writing with light}, you know, what the plastic will do. The fact that it holds the light energy. It's like educational as well. I mean I wasn't aware of what plastic can do, you know, that it holds light energy for a short while over here {points at the exhibit screen on the picture}. I didn't know that until I came here {laughter} – for the knowing how. Yeah, it's a good day out, occupies the kids and teaches them these things {points at pictures}. (F1, Q7-9/A)

One family member made a distinction between two types of exhibits: the educational and the entertaining ones. What differentiates the educational from the entertaining exhibits is the fact that one needs to think in order to understand what they are about. On the other hand, entertaining exhibits, however interesting they may be, are merely enjoyable and are not associated with learning:

W: I think some things are appealing without learning anything from them. I mean they're just nice to look at and, you know, they're interesting rather than, you know//
M: //Just with the light.
W: //yeah, they're more technical in use and things and you think 'oh right, that's what it is', you know. You enjoy things in different ways, I mean, that bubble thing I could have watched that all day//
M: //Yeah//
W: //but that was for pleasure rather than for learning. But other things, you know, you can look at and say 'oh, that's really good' – the magnets, that you can use different metals, you know, that was a learning thing. It makes you think, you know, 'oh, great that's, you know' (...). (F13, Q7-9/B)

Apart from the bubbles, the exhibits on sound seemed to be seen as entertaining rather than educational. One of the exhibits the child in the above family chose to talk about was the percussion pipes. On failing to answer what he thought the exhibit tried to show him, his mother replied: 'he just enjoyed it'.

Three other family members referred – directly or indirectly – to the fact that they found some of the exhibits mentally challenging. These exhibits seemed to require a lot of concentration and thinking to make sense. Here are a couple of typical examples:

W: It {shake hands} just confuses me totally. It's back to front and it makes you think about what is actually going on.

B: Like the one with the reflected words.
W: Yeah, that's right. (F26, Q7-9/C)

W: That one {back-to-front viewer}, trying to put your feet the opposite way. When I had the glasses on I had to do everything in the opposite way and actually did it without falling off. (F17, Q7-9/B)

In another case, it was by asking a series of questions that a family visitor understood what the exhibit was about. In the following case, this adult reconstructed what went through his mind on facing a new situation where the concept was quite novel and shows how he used his previous experience to solve the problem:

M: I often, I try to sort in my mind 'how does it work?', 'how is this happening?'. You don't, it doesn't say on everyone how this happens, you know. You draw with light and it retains the light for a short period (...). 'Is it a light sensitive material and fades away or like some of those others, the heat sensitive where you put your hands on?' And then when you print, well, you understand how that works but not the other. 'Is that on the same principle', 'is it the heat or just the light on that?' Some times they tell you what to do but not why this is happening. Yeah, at the air you're reducing friction and all that. You understand all these but when you come to something like that and you say 'what's happening in here?', 'why is it doing this?' (F7, Q7-9/A)

The fact that the exhibition was perceived as being aimed mainly at children was also evident in the ideas of the adult family members about it. The following section will try to examine this issue.

5.5.3 Who is the exhibition for?

Three-quarters of the family groups specified who they thought the exhibition was for. They were all adults (in 12 groups) whose most common answer was that it is 'educational for the children'. The doing aspect of the Xperiment! exhibition as well as the fact that it presented basic scientific principles were often mentioned:

M: I mean these {refers to the hands-on exhibits} to me they're all pretty elementary because they're aimed at children, you know, ehm (...) I mean I understand the principles of them all. (F22, Q7-9/C)

M: Well, J.'s got a very active sort of mind and he's very interested in all sorts of things, you know, particularly how things work. He's very interested in that. He's always asking questions about 'how did you do this?', 'how did you do that?', 'how does this work?' (...) and of course this place is the ideal place to learn that sort of

thing, you know, to find out how they do work – engines and machineries and various things. It's for J. really ehm (...). (F9, Q5)

W: Yeah, we know that kind of things. We were already interested in science. All the things here are on basic principles of science and industry but it is good for the children//
M: //Yeah. (F15, Q13)

Five adult family members believed that the Xperiment! exhibition was for everybody and was informative for adults as well as children:

M: I like the experiments myself. I like doing them. I like going round museums (...) it just opens your mind. Most of the things that they've got, you know, like the experiments, they're informative, you know. It just opens your mind basically, yeah. There're certain things that, you know, 'oh, I didn't really know that' and then you do it and 'oh, that so does and that does that', you know, and I enjoy it. It's great. It's informative. (F14, Q5)

Adults also felt that they were introduced to new technology:

W2: It was interesting to see, ehm, how they do, I mean those electric wires to me, those very fine wires//
W1: //Fibre optics.
W2: Yes, those things were fascinating really, you know. (F13, Q5)

5.5.4 Addressing the personal and social agenda of the visit

During the second part of the interview, pictures of the exhibits in Xperiment! were used as a stimulus for further discussion. One of the things that came out as a result of this was the behaviour that it stimulated among adult family members in particular. All family members of the groups were quite keen on exchanging ideas and information about the exhibits and on discussing which exhibits they used, how they used them, what they liked and what they did not like, and what confused them. This was quite a consistent behaviour throughout the interviews. Family members were more concerned with talking to each other rather than the interviewer.

Two main types of behaviour were noted: either adults tried to 'teach' children or both adults and children exchanged ideas about the exhibits. These types of behaviour seemed to be closely related to the ages of the children in each groups and partly to what type of visitors the family groups were[47]. Although the first type of behaviour seemed to be initiated by adults, it was actually necessary that both parties whould co-operate. Where children were not in a co-operative mood (3 cases), the exchange was not successful.

[47]It refers to frequency of visit.

Thus, in the first case adults stimulated an exchange of information about specific exhibits. The family groups who showed this kind of behaviour (9 groups) consisted of quite young children (from the age range 4 to 7, or 8 in a few cases). In three of these groups the children were quite frequent museum visitors and it was they who asked the adult family members questions about the exhibits. In another two family groups, the adults thought that the children were too young to understand the exhibits and did not ask them any questions. As was seen in the the first section, it was the parents especially who were concerned with influencing their children's educational experience. Finally, there was a family whose members had major problems of communication due to different agendas between the adult and the child family members.

There were certain techniques which adult family members employed to transfer knowledge to the children. The most common technique was that of asking questions and providing positive rewards when children gave the correct answer. The following extract is taken from the interview with a man, his daughter and her friend[48] and is a typical illustration of this point:

M: Any others that you remember?
G2: I did that {points at sound bars} today. I remember them.
M: The two of you had a go on this one {points at percussion pipes}. Do you remember what you did?
G2: Yeah, it was beating//
G1: //And you had to get one of those hands and then you went bhamm, bhamm//
G2: //And you had to follow the lines on the book.
G1: Yeah. I did and the colours helped yourself find which one to beat.
M: How about this one {refers to the electromagnet}?
G1: I remember that one! That one stuck and those two didn't.
M: Correct. Do you remember what the materials were?
G1: I can remember, ehm, iron, steel, metal and (...)
M: And the others were copper and aluminium. (F18, Q7-9/B)

Adult seemed to consider the children's age when asking questions and guiding their thinking[49]. The younger the children were, the less complicated the questions were. Adults seemed to follow this rule and take one step at a time as seen in the above example. If they failed to do so, children were less likely to respond as in the following example:

{the boy sees the hot air balloon rising through the window of the interview room}
B: Daddy look, it went up!
M: Yes and you know why it went up? We were talking about this just now.

[48]They both were 5 years old.

[49]This pattern of adult behaviour that is changed according to the child's age to provide more guidance is consistent with research based on Vygotsky's work on self-regulation (Vasta et al:494).

B: Yes, it was taking a long time.
M: But why was it going up?
B: It does, it goes up and then it goes down.
M: Yes, but what was it doing it. It was filled with hot air, wasn't it?
B: {says nothing and looks puzzled}. (F21, Q7-9/C)

This question-asking behaviour went on for a while but then, the man tried asking simpler questions starting from what his son already knew or had observed in the exhibition:

M: And this one {points at the picture of spin me}, what's happening with this one?
B: I, you pulled that {points at the chain in the picture} and it {refers to the ball} went back in again.
M: Daddy was spinning it, wasn't he, and then, when you pulled the handle, it went faster, didn't it?
B: Yeah.
M: And then it stopped. (F21, Q7-9/C)

As seen in the above examples, when the child was unable to answer the questions the adult gave the correct answer and provided him an explanation of some kind as to 'what happens'. Thus, the technique of question-asking and positive reinforcement is enhanced by those of providing clues as to what the 'correct' answer is; introducing children to new terminology and more abstract concepts; and providing an explanation of the phenomena observed or clues which point to an explanation. The following extracts demonstrate some of these techniques used by two adult family members:

M: And that one {electroscope}, we rubbed the plastic, this plastic {points at picture}, didn't we, with fur?
G: Yeah, we rubbed that plastic and then (...)
M: And then what happened?
G: This opened up {points at the sheets of gold in the picture}.
M: It opened up, didn't it? Yeah, they moved apart as you applied the charge from the piece of plastic. And that was a good one {hanging magnets}, wasn't it? That taught you about magnets, remember?
G: Mmh.
M: What kind of poles weren't attracted?
G: Mmh, the north (...)
M: It wasn't two similar poles, let's say two souths. They repelled, didn't they?
G: Mmh. (F2, Q7-9/A)

G: I moved that {points at the handle on the waterwheel exhibit at the picture} like that {demonstrates movement} and then – until it's filled up – and then you let it go and then pulled the chain and then it all (...) and then the light comes on.
M: And why did the light come on?
G: Oh (...)
M: Did these spoons go round?
G: Yes. (F3, Q7-9/A)

Adults consciously tried to make children more aware of what happened with each exhibit by asking them a series of questions. They were the type of questions which the children should, effectively, ask themselves in search of the answer. This process added to their knowledge of what happens by describing their observations and – to some extent – the reasons why things happen in the cases where adults helped the children to explain their observations. Furthermore, this process provided the children with the tools they need to scientifically explain the world around them. Observing, asking questions, communicating and explaining how things around us behave are fundamental parts of the scientific process. The interaction between adult and child is, according to Vygotsky (in Vasta et al 1992), a central element of the transfer of knowledge and provides children with the tools to pursue knowledge on their own.

Families with older children tended to discuss the exhibits. Older children seemed to be able to guide their own behaviour and actions and adults needed to give less direction. This relates to Vygosky's idea of sociogenesis[50] and is supported by recent research (Vasta et al 1992). Seven groups with children from the ages of 9 (and in one case 8) and above exchanged information about their experience. Not only did they share information about the exhibits and the phenomena presented, they also shared information about what they enjoyed doing and about themselves. The following quote is a typical example of this point:

G: That one {bubbles}. That was my favourite, the best.
W: I was, you were blowing it, weren't you?
G: I was sort of blowing it and then I could turn off which (...)
W: Well, of course it bursts then, doesn't it?
G: Yeah
W: But you see she was trying to get as far as you could, didn't you, to make a big tunnel with it. What was the other thing?
{I: what was your favourite exhibit?}
W: Oh, I liked them all. I enjoyed all of them, yeah.
G: These two {points at bubbles and percussion pipes}. I tried to play without looking {refers to the percussion pipes}.

[50]'The process of acquiring knowledge or skills through social interaction'(Vasta et al 1992:494).

W: Without the music she tried to do it, yeah. She tried to make her own tune.

G: The one I play on the piano.

W: The different pads; it made the sounds and really high.

G:Yeah. (F10, Q7-9/B)

The discussion on the percussion pipes was a good way for the woman to learn more about her granddaughter's progress in her music lessons. Examples such as the above address the social agenda of the groups. The adults mainly discussed the children's performance, compared it with the previous time they visited the Museum or with activities they pursue at their free time.

Although knowledge was transfered to the children, it was often done in a subtle way. Adults did not need to lead children to the answer as children could do that themselves. Thus, adults accompanying older children tended to pick up on points children made and took them a bit further or just added to them.

It would be useful for the Museum to further understand how family visitors use the exhibits to interact with each other so that this information can be used to design exhibits which facilitate the social interaction between family members.

5.5.5 The exhibition and how it was perceived

The way Xperiment! was perceived during the visit and, then, reconstructed during the interview was closely related to the agenda of the family groups. Their ideas and preconceptions about the theme of the exhibition influenced the way the exhibition was read and reconstructed by family members. Although these reconstructions did relate to the content of the exhibition they did not always reflect the messages which the Museum intended to communicate. Even though there were a few cases where the family members' reconstructions did reflect the message of the exhibition, this seemed to relate to the previous knowledge the family members, especially the adults, brought with them.

The Xperiment! Gallery is organised into two main themes, light and energy, and it is physically divided into three main areas. The physical barriers between these areas are curtains which are attached to the roof of the building and which control the amount of light passing through. Thus, for example, the second and the third areas (figure A.1) are quite dark compared to the first one where there is ample natural light coming through the dormer-windows. Unlike conventional galleries, the exhibits in Xperiment! are not grouped together according to a particular theme. The way the Gallery is organised was mainly dictated by practical considerations. It is organised in terms of the amount of light needed for the exhibits to function. This organisation is not signalled in the introductory panel nor in the exhibit labels.

Exhibits are stand-alone structures individually named according to the concept they present. Every exhibit has its accompanying text which varies considerably (photographs

of labels can be found in Appendix A). The name of the exhibit is always provided at the top. In some cases the label may describe what visitors need to do to operate the exhibit, or it may provide a description of the phenomenon based directly on observations. In other cases[51], the label provides a more abstract explanation of the concepts involved. There is not a uniform font size. In many labels simple information is presented at the top in larger typeface while more complex information or difficult concepts are presented further down in much smaller typeface. However, this is not always the case. In some cases information of the same level of simplicity/difficulty is presented in different font sizes. In other cases, the same font size is used for the whole text. Thus, there is not a single approach to the way the exhibits are interpreted, or the amount of information provided. In addition, only three labels (the musical sonar, spin me, human battery) try to give a point of reference relating the exhibit to something within the experience of the visitor. Furthermore, there is no suggested route which visitors should follow. Visitors can choose which exhibits they want to use. The physical structure of the Gallery – especially the ability to see far ahead – contributes to the freedom of choice visitors have upon entering the Gallery. This was reflected both in the movements family members made throughout the visit but also in their accounts of the visit. Thus, the majority of accounts of the Gallery did not seem to reveal a structured reading at all. Moreover, family members did not seem to associate the exhibits with the themes around which these were developed.

Six family groups (5 adults and 2 children) referred to the exhibits as 'the experiments'. One of the children – an 11 year old girl – made a distinction between 'the experiments' and 'the tests', that is the puzzle table. Only one adult family member referred to two groups of exhibits as the 'optical' and the 'sound' ones. In all other cases, family members referred to individual exhibits as isolated activities. This was the case for adults and children alike. However, adults were more likely to mention what the underlying principle was and to use more technical language than the children did. The emphasis here is more on the actual way family groups reconstructed their experience rather than what they learnt from it.

Reconstruction of the visit Although there seemed to be no structure in the way family members read the exhibition, there were some consistent themes in this. Despite the fact that family members were unable to associate the exhibits with either of the themes developed by the exhibition makers, their reconstructions tended to focus on their action and/or the exhibits' reaction, and more rarely on an abstract explanation of the concept or the phenomenon. Thus, they focused on the reconstruction of their observations during the interaction with exhibits or provided an explanation using scientific terms, and in a few cases they did both. The fact that most family members did not use abstract concepts to explain the underlying principle of an exhibit is not necessarily suggestive

[51] This applies to almost half the labels.

of their understanding of it[52]. It is rather related to their ability to describe a concept using abstract language (ability connected to higher education) rather than their ability to comprehend it. Thus, the examples used in this study do not intend to assess the understanding of scientific principles by the family members. They only present alternative reconstructions or reading of the exhibition to the ones intended by the exhibition team.

Furthermore, only half of the labels on the exhibits about which the family members talked, provided an explanation of the underlying phenomenon. For the other half, no explanation was provided by the labels. It seems that this has not directly affected the children's description of the exhibits in any case. There is indication, however, that children's description of the exhibits has been directly affected by the accompanying adults. On the other hand, it seems that a few adult family members did use the information contained in the labels when they talked about the exhibits. Label reading was one of the things that mostly adults were observed doing during the visit (cf. table C.1).

Family members in twenty groups out of the 29 tried to personalise the information contained in the exhibits by making links with their experience or previous knowledge while at the same time they addressed their personal and social agenda. This shows that family members' need to have a point of reference and make links the with previous experience of the family members. Some visitors (in 7 groups) responded emotionally to the exhibits (further discussion in section 5.5.5).

Seven adult family members (in 6 groups) referred to the exhibits the children in their group used and enjoyed. Two of them mentioned that the exhibits in Xperiment! present basic science principles which they already know and which they wanted the children to learn.

The following discussion presents two alternative ways in which the exhibition was perceived by the adults and the children interviewed: 'how it works' and 'what it is about'.

(a) 'How it works' Family members in two-thirds of the groups referred to the exhibits in terms of how they worked. Thus, their accounts were based on their observations or on their kinaesthetic experience with the exhibits in Xperiment![53]. The presentation will start with the children's reconstruction of the exhibition.

Children The children's reconstructions focused on the kinaesthetic experience – what their actions were – and on their observations of how the exhibit reacted or what the result

[52]Levy-Leblond (1992b), commenting on current approaches to assessing the understanding of scientific principles by the public, argues that the ability to abstract is developed by a small elite and comes from higher education. This ability is often alien to many social groups, including experts and non-experts, and lack of this ability does not necessarily mean that they are ignorant. Instead he (1992b:19) argues that, 'people show a rather uncanny ability to learn what they need and not more [...]'. He (p. 20) claims that 'instead of an ideal of absolute knowledge, it is a reality of relative ignorance with which we have to deal'. Also see the section on Wynne's study in Bradburne (1993a:90-91) for a discussion on the fact that people have a high level of scientific understanding in their own realm of experience.

[53]There were children 21 children (in 18 families) and seventeen adults (in 14 families).

of their action was. The following extracts are typical examples:

G: {bubbles} Well, it doesn't blow normal bubbles. You just pop and then you (...) and it makes a hole and you can put your hand in, you know, you pop in. But then if you blow too hard it pops. (F14, Q7-9/B)

B: {percussion pipes} It's just (...) different colours are there and there's that hand {refers to the beater} and you put it on a colour and then it makes a sound. (F16, Q7-9/B)

Here is a different version of the above exhibit given by another boy:

B: I took the finger and banged the black thing {refers to the beater} and then it started making a tune and it was different. (F24, Q7-9/C)

In their effort to communicate their experience, apart from speech, some of them used body movements, sounds and the pictures of the exhibits used during the interview:

G: {waterwheel} I moved that like that {points at the handle of the waterwheel in the picture and repeats the movement moving her hand forwards and backwards} and then – until it's filled up – and then you let it go and then pulled the chain and then it all (...) and then the light comes on. (F3, Q7-9/A)

G2: {percussion pipes} Yeah, it was beating//
G1: //And you had to get one of those hands and then you went bhamm, bhamm// {repeats the movement with hand and makes a sound}
G2: //And you had to follow the lines on the book. (F18, Q7-9/B)

B: I remember a lot of these. I remember that one {points at the picture of the spin me}. I just pulled and swing it round and I pulled that {points at the chain in the picture} and it get on there {and points at the picture again}. (F4, Q7-9/A)

Of course, it could be said that they lack the ability or the vocabulary to describe their experience verbally. However, according to Dyson (1990) the use of different forms of symbols shows children's ability to express their feelings and experiences. Bodily gestures, sounds and drawings representing objects and events, are the media children use to make meaning out of their environment and to communicate it to people (Piaget 1962, Gardner 1973).

The fact that children can touch and use all their senses in the exhibition is particularly important to them and it is in accordance with their expectations in visiting Xperiment!, that is, in order to touch things. The emphasis on the kinaesthetic part of the experience was reflected in the children's drawings of particular exhibits. They seem to have depicted

specific parts of the exhibits: what they touched and, where possible, the part of the exhibit which they observed changing as a result of their action.

The first drawing (figure 5.1) depicts the back-to-front viewer exhibit where visitors are supposed to look through the glass at the footprints and then try to walk on them. The part of the exhibit which is prominent in the drawing is the footprints where all the movement was concentrated. The same happens with the second drawing, the electromagnet (figure 5.2). The child who made this drawing included the part of the exhibit which he touched when he interacted with it. Depicted is the electromagnet with the switch and the small light and under this the four different metal bars. The part of the exhibit shown in this drawing includes all the details of the actual exhibit.

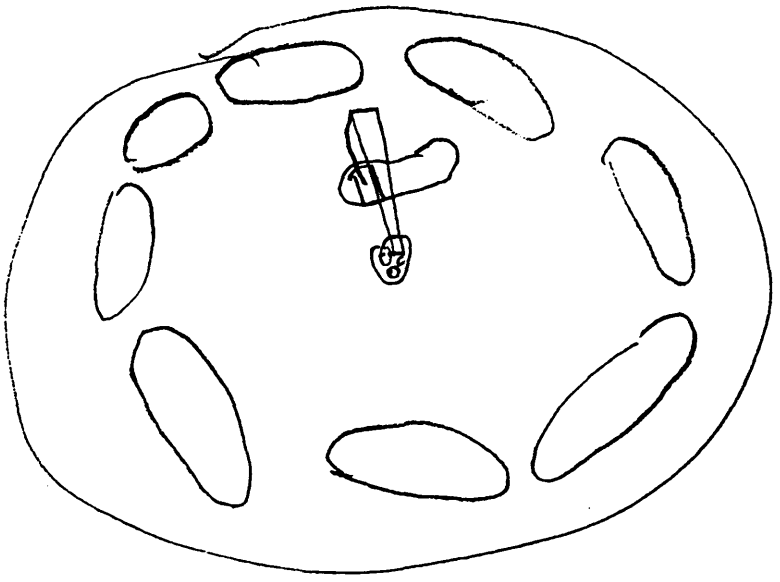


Figure 5.1. *Drawing of the back-to-front viewer (girl, age 6).*

The next drawing (figure 5.3) represents the waterwheel exhibit. This particular exhibit was not exhibited on the day of his visit but it was his favourite one and – being a frequent Museum visitor – he could remember it from the last visit. In his effort to show movement, he used thicker zig-zag lines at the upper part and round the right side of the drawing to depict the movement of the water. He used the same technique for the handle in the bottom. This is the handle which he had to move from side to side to fill the tank with water. He also included the wheel and the name of the 'Xperiment!'. During the interview, he referred to the kinaesthetic experience by saying that he liked that particular exhibit 'because it exercises your muscles'.

As mentioned above, there does not seem to be a direct connection between the information contained in the labels and the description the children gave of the exhibits. One of

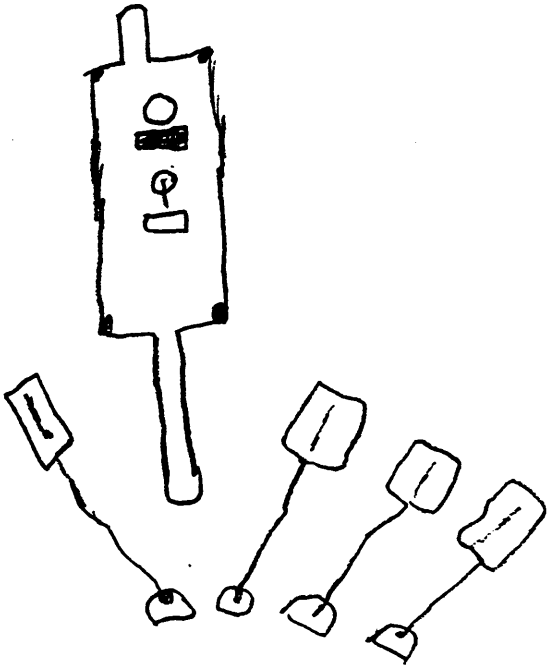


Figure 5.2. *Drawing of the electromagnet (boy, age 7).*

the children interviewed who visited with his father seemed likely to have been influenced by their discussion about the 'hot air balloon'. Their responses were quite similar and they did not contain the information provided by the exhibit label. This is the response the child gave:

B: I liked this one. It tried to show me how hot air can lift things up. (F9, Q7-9/A)

Compare it with his father's response later on during the interview:

M: Ehm, I didn't have a favourite one; I just liked them all. Well, the hot air balloon, you see, it took so long for the hot air to lift it, you know {laughter}. It's a practical demonstration that, isn't it, of how hot air rises and it would lift objects, you know. It was in volume. Very good demonstration of exhibit that is. (F9, Q7-9/A)

During the visit these family members were observed discussing the exhibit and interacting with it.

Adults Seventeen adult family members reconstructed the exhibits based on their observations while four of them also used information provided by the labels. A couple of them tried to give some sort of explanation of what happened but this was that the correct answer nor did they use abstract language. Adults' reconstructions of their experience with the exhibits tended to concentrate on their action and what the reaction of the exhibit

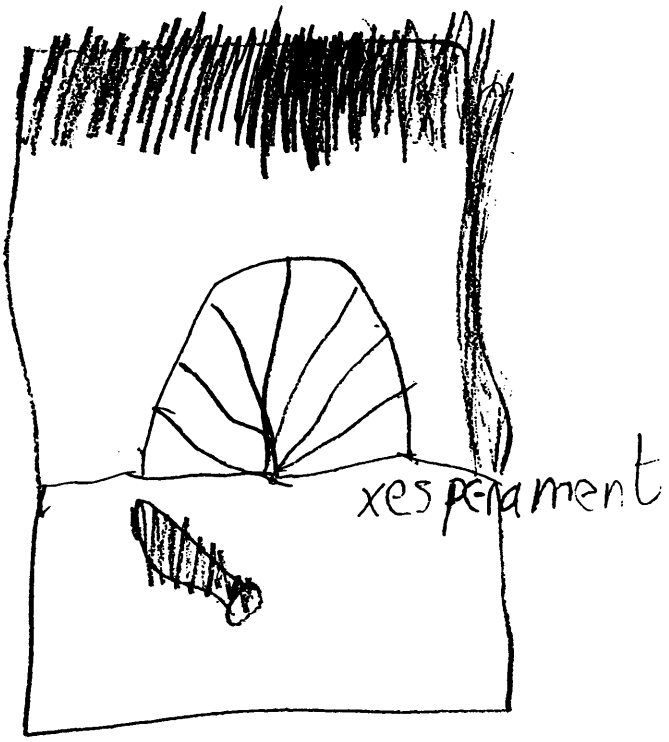


Figure 5.3. *Drawing of the waterwheel (boy, age 7).*

was or what they thought about it[54]. Unlike the children, they only relied on speech to describe the exhibits. The following quotes are typical examples of this point:

> M: {shadow flash} Oh, the one where you stand at the thing and you press the photograph sort of thing and it flashes and when you move away you see your shadow. (F14, Q7-9/B)

> W2: {air track} I thought that was very good. Well, it was more or less just the thing that that thing {refers to the carriage} could move just on an air current, the pressure of the air. How fast it can go just like that, you know. That was quite fascinating. (F13, Q7-9/B)

> W: {shake hands} It just confuses me totally. It's back to front and it makes you think about what is actually going on. (F26, Q7-9/C)

Four adult family members also seemed to have used some of the information contained in the exhibit label or at least to have paid attention to it. This information is used as part of the reconstruction of the exhibit:

[54]This is what the majority of the child family members did as well.

M: {hot air balloon} It just shows you how a balloon works; how hot air rises and the more hot air you put in the higher it goes up, yeah. (F12, Q7-9/B)

M: {syphone} Well, I think it was proving the point that water can be made to flow uphill. It was quite good at it. (F5, Q7-9/A)

(b) 'What it is about' Ten adult family members and only two children described the exhibits using abstract language. For five out of the ten exhibits these family members talked about, explanation was provided by the labels. The labels of the other five exhibits provided instructions on how to operate the exhibit and what to observe. This means that four adults and one child used prior knowledge to describe the exhibits or it was a result of the social interaction between the family members. There is some indication that three of the adults used information contained in the label when they reconstructed the exhibits. Another three adults seem to have come up with a different explanation and to have used different wording from that contained in the label. Two of them came from a science background. The presentation will again start with the children's reconstruction.

Children There were two children who made an effort to use abstract language to describe the underlying principle presented in two of the exhibits, the waterwheel and the electrical circuit. Only for the waterwheel was the explanation included in the label. However, in both cases the children were quite young (4 and 3 1/2 years old) which means that the phenomena were interpreted for them by their parents. This information is supported by the family observations. Both parents reinforced the ideas presented by the exhibits during the interview by using a series of questions following the different stages of interaction with the exhibit:

B: {waterwheel} I pulled the lever and then the water was gone.
M: When the water wheel turned round did it make anything happen?
B: Yes! the 'X' {it stands for Xperiment!} lighted.
M: The 'X' lighted, yes.
B: Water makes electricity! (F29, Q7-9/C)

M: {electrical circuit} And you always want to know how electricity works and how torches work//
B: //Yeah, and there's a pipe, there's a pipe going round and round {refers to the electrical circuit}.
M: Not really a pipe, it's a very thin wire.
B: No, that's a pipe there.
M: It could be a pipe. You see the electricity goes from the batteries and when you press all the switches up it joins up all the 'pipes' and that's what make the motor go round. (F21, Q10)

Although the language these children use is not precise, there is evidence that they have reached a level of abstraction. The phrase 'water makes electricity' seems to refer to the change of energy (from movement to electrical) given the context in which it was said and the boy's age. Again 'a pipe' is a way of representing an abstract concept like that of electricity[55].

The first child above (F29), actually drew the same exhibit (figure 5.4) including the part which he actually moved or touched and the part where the lights came on. Thus, one can see the wheel which he moved to put the water into the tank, the handle he pulled to empty it and the 'X' (which stands for Xperiment!) which lights up as a result of a series of actions.

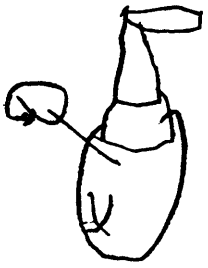


Figure 5.4. *Drawing of the waterwheel (boy, age 4).*

In both cases, the parents made an effort to affect their children's educational experience. They had a very strong agenda for learning which affected their Museum experience. Visiting the MSI – and in particular Xperiment! – was on their education itinerary. Furthermore, they both referred to learning as an accumulative process rather than a one-off thing[56]. Given that both children are below reading age, it could be said quite confidently that, what those children learnt, was a result of the social interaction between the adult and the child. The exhibition provides the resource for these family groups to interact and modify their thinking. The cooperation between parent and child is a key point for

[55]Pipe is a term often used instead of wires. The analogy here is between water pipes and electrical wires. This type of analogy is often used in popular science books. The same analogy was used for one of the Exploratorium exhibits: 'the exhibit "Electrical Analogy" displays a fluid reservoir system next to an electrical circuit' (Hein 1990:118).

[56]Refer to the discussion and interview extract in page 77.

the transfer of knowledge which takes place [57].

Adults Only ten adult family members reconstructed the exhibits using abstract terms. Eight of these were men[58]. They all gave an alternative explanation not included in the exhibit labels. The language used by the adults was much more technical and more precise than that of the children. The following quotes are typical examples:

> M: {spin me} I liked that one. I thought it was very effective (...) that was when you pulled the ball – the faster rotation the smaller radius on the ball. That's all I thought. I liked the explanation. It said it was like the ice-skater. You could do it yourself very easily and quickly; quite a dramatic demonstration, simple but very effective. I liked that. (F2, Q7-9/A)

> M: {waterwheel} Which one was my favourite? Well, I think that one, turning motion into electricity. (F3, Q7-9/A)

> W1: {musical sonar} The black spot, you know, when you rise your hand under that it changes, you get a different music. The different heights and the different frequencies used to give different sounds. (F25, Q7-9/C)

The next sections of this chapter refer to alternative ways in which the family members approached the exhibits. They refer to the way family members tried to make the information provided by the exhibition more personal and relevant to their needs. They also include visitors' affective reaction to some parts of the exhibition.

Reconstructing the social agenda As mentioned above, quite a large number of family groups (20 groups out of 29) tried to personalise the information contained in the exhibits and/or in the accompanying text, and relate it to things they already knew. In particular, they made connections with similar hands-on exhibits they had seen in other institutions, with science or music classes at school, with hobbies of theirs, and with everyday things which the exhibits reminded them of. Here are some typical examples:

> W: {percussion pipes} That was that lady who did the (...) he {she points at her son} did one of his violin tunes on that one, you see, he plays the violin. Also it's linking with this one, there's another one in B. {refers to the science museum in their home town}. It's actually natural, ehm, tones you just listen. You don't do anything you just listen to the tones and you can hear the scale just by listening; you don't do anything.
>
> B: You have sounds round you.

[57] This is what Vygotsky called the 'social organisation of instruction' where the cooperation between adult and child is seen as a central element of the educational process (Moll 1995).

[58] The two women in this sample were from a science background.

M: It's just the environmental sound. It's on frequencies and you just listen to the bottoms of the tunes and you can hear the actual scale in amongst sounds. (F13, Q7-9/B)

W: {electric fleas} I think the jumping flea one because, ehm, it brought that memory, ehmm (...) She's doing magnetic fields and it drew back memories of doing that experiment years ago with iron shavings and a magnet, you know, and then moving about and making them move. I did that in my own school days and that brought back memories of that and, you know, it's just another way of showing how it works really. They're all very good though, well done. (F10, Q7-9/B)

B: This one {percussion pipes}. I like playing it. We've got something similar at school. I've used it before at school that's why I liked those pipes. (F26, Q7-9/C)

A few of them used familiar concepts to describe or explain some of the exhibits:

B1: {musical sonar} I liked the piano one. It was good. (F27, Q7-9/C)

W: {giant prism} We saw that one where it made the rainbow on the end with the lights, do you remember? (F30, Q7-9/C)

Some others – particularly young children – used an exhibit or described it in terms that made sense to them even though they could not understand what it was really about:

G: {writing with light} I wrote my name on it. (F2, Q7-9/A)

M: {the man picks out the picture of writing with light and reads} Writing with light.
G: I wrote my name.
M: She wrote her name on it, didn't you, and what else did you put on it?
G: I drew the picture of a house.
M: She drew the picture of a house. (F28, Q79/C)

F: And what did you like sweety?
G: Ehm (...) that one, I played {points at laser drawing}.
F: And what happened?
G: Flowers. (F20, Q7-9/C)

The last extract is taken from an interview of a family group consisting of a man visiting with his 3 year old daughter and his nephew. It shows the attempt of this young girl to make meaning out of her new experience. What she saw on the screen of the laser drawing exhibit was different patterns, the shape of which reminded her of flowers. In her drawing (fig 5.5) she not only tried to depict the physical features of a flower (look

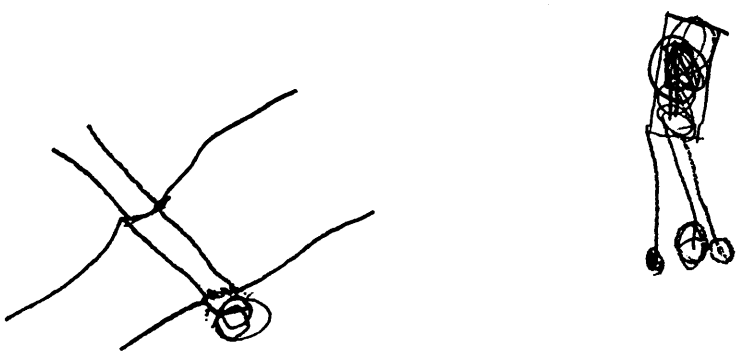


Figure 5.5. *Drawing flowers with laser (girl, age 3).*

at the round shapes of the bottom image at its left side), she also tried to represent the movement of the laser line by drawing a spiral-shaped image (at the right side).

When specifically asked, family members in 25 groups out of the 29 (18 children and 20 adults) were in fact able to make some kind of connection between the exhibits in Xperiment! and everyday experiences. Most of them made direct links with particular exhibits and examples of applications of those ideas in everyday life. Children were as good as adults at making connections with everyday experience – usually to do with school. However, not all of these connections were correct apart from the ones stated in the labels[59].

None of the families referred to the explainers as they reconstructed the visit. As was mentioned above, the family groups observed did not come into contact with the explainers[60]. As a result, when specifically asked, the vast majority of the family members said that they did not interact or see any explainers in the exhibition. Only four family members mentioned that although they saw the explainers they thought that their role was to 'keep the peace', to keep the place clean or that they were school teachers[61].

[59]Section 5.5.6 discusses family visitors' ideas about science in everyday life.

[60]This is not accidental since the explainers in Xperiment! do not deal with family groups at all. They avoid approaching them because they believe that family groups are quite close social units and should not be disturbed (1/1995 pers. com.).

[61]The explainers welcome and introduce school parties to the exhibition for a few minutes when they first arrive.

Family members seemed to address their personal and social agenda while they reconstructed their experience with the exhibition. There is indication that the agenda of a lot of the family groups was quite strong. It also seems that it influenced the way they viewed the exhibition as a whole as well as individual exhibits. The reconstruction of the social agenda of the families gives an insight into the nature of the visit experience. Family members made references to their personal and social agenda while exploring the exhibition (with its educational, recreational, social and other functions). Thus, the exhibition provided the social context and the cultural resource centre where the family interactions took place, and needs, expectations and wishes were met while at the same time influencing and redefining them.

Affective experience Family members in seven groups found a few of the exhibits quite attractive to look at, aesthetically pleasing, fun or weird. Their response to these exhibits seemed to be more emotional rather than logical. It was not the experiment or the underlying principle that attracted them to the exhibit but the effect it had on them. Here are some typical examples of this point:

> M: {musical sonar} Well, I like the one that you stand on and it makes music from over above you.
> {I: what do you think it tries to show you?}
> M: I don't know, ehm, it's hard to explain. Well, it's just the experience of walking, like I was walking, through beams and I was thrilling off different sounds. I don't know, it's something to do with the microphone above. It's just weird though. It was weird, yeah. (F26, Q7-9/C)

> M: The wall {refers to the flash shadows} I suppose was the most impressive one, the shadow with the light. I think it was just impressive. (F27, Q7-9/C)

> G: {bubbles} This one made me feel weird, that one. That's nice it makes a rainbow. (F14, Q7-9/B)

Responses like these were expressed for specific types of exhibits: mainly the ones about light (to do with colours and mirrors). As mentioned above, an adult family member referred to one of the exhibits on light (the bubbles) as being purely for fun or pleasure rather than learning. There is some indication that the same applies to other exhibits as well, mainly the ones which produced sounds, were about colours and the mirrors. However, this is a point which needs to be further researched.

There is one case of a 4 and a half year old boy visiting with his grandmother where the response was quite negative. During the visit he seemed to be intimidated by the fact that the Xperiment! Gallery was so high up (they followed the ramp to come up) and that two of the areas were quite dark. When they arrived at the exhibition the boy were heard

to say to his grandmother: 'look how high we are! I told you, didn't I?' and he tried to persuade her to leave. The grandmother, on the other hand, had to make a lot of effort to keep him interested. These issues came up during the interview as well:

W: I have to be enthusiastic about it to make him interested otherwise he's a little bit timid about new things so, ehm. Well what didn't you like about it then?
B: Ehm, dark.
W: It was dark, it was pretty dark, yes. (F30, Q5)

Family visitors ideas and preconceptions about hands-on museums and the theme of the exhibition itself influenced the way the exhibition was perceived and reconstructed. Being able to touch and experience the exhibits was considered as assisting learning as compared to other resources available such as books.

5.5.6 Ideas about science and technology

Family members were asked to name some applications that the principles or ideas presented in the exhibits may have in everyday life. There were also asked whether their visit(s) to the Xperiment! Gallery had changed the way they viewed science. Responses to both questions revealed the respondents' notions about science. The issues that seemed to arise were the accessibility of science and technology in everyday life and how family members use museums (particularly hands-on museums) to achieve scientific literacy. Another issue which seemed to be implied rather than explicitly mentioned was that of what counts as scientific and what does not. As mentioned above, there seems to be a distinction between different categories of exhibits in Xperiment! There is some indication that the exhibits which seemed to be regarded as more scientific were the ones to do with electricity.

Five adult family members mentioned how inaccessible science and technology (in particular new technology) is in everyday life. It seems that they mainly referred to domestic electrical equipment. The fact that most of the appliances are covered up and have been part of people's lives for so long, deters people from noticing them. The following extracts are explicit examples of this point:

M: Well, you don't normally see things like these in the ordinary everyday life. I think they're {refers to the exhibits} cleverly designed to show the principles of physics but in everyday life it just passes over the top of the head most things that you see, scientific principles of things. You don't realise it. I mean you see the bubbles, don't you, if you're washing up and you pull the dish out and get the bubble and the soap. Electricity, it's just a switch on the wall, isn't it, you don't see it. (F22, Q10)

W: Well, there's a lot of things that affects you but you just don't appreciate them but there're around you all the time, aren't they. You can't think of them because

they're so (...) normal! They're lots of them, it's just that you can't think of them at the spur of the moment because you take them for granted. (F13, Q10)

Even when family members did understand the underlying principle of an exhibit, they could not always relate it to everyday experiences. The fact that the exhibits were not in context reinforced the image of science and technology as being inaccessible. The Museum does not appear to make links between the exhibits in Xperiment! and real life situations through written material, nor, it seems, do the schools. According to Yorath (1995), science at school – and in particular at secondary level – is often taught in isolation. Pupils are not taught how to apply scientific knowledge in real life situations.

However, there is strong evidence that families use the Museum as a resource for self-directed learning and for helping their younger members achieve scientific literacy. Fifteen family groups said that they already had an interest in science and technology which was one of the reasons for visiting. In some cases (7 family groups), the children had already done science at school and had developed an interest in it. Another seven groups mentioned that the actual visit(s) to Xperiment! made a difference in the way they viewed science afterwards. Whether they visited Xperiment! to follow up or to develop an interest in science and technology, family members thought that the fact that they had a first hand experience, that they were able to join in the activities and to see and think about how things work for themselves did make a difference:

F: I think it's very good, very simple explanations of scientific principles, I think. They've made you think about it and they've explained you why, I mean, sort of getting you to understand why in a simple form and that's very good. (F2, Q13)

B: Yeah, because it makes you think more and gets you more into science. (F25, Q13)

M: I think because they were able to join in, isn't it {to G}? You were able to do things and if you do things you're more interested than looking at things but I could be wrong. Yeah, I'm very impressed with the things in this particular Gallery. It's excellent for children, ehm, but I think that, as I was telling you earlier, it's for them more than for myself. I'm very interested in aeroplanes and trains but I suppose I wouldn't necessarily have come if I hadn't brought the children with me. (F6, Q13)

Thus, visiting the Xperiment! exhibition is one of the resources available for the socialisation of children's thinking. The fact that it is distinctly different from other socially provided resources (such as books, school or hands-off types of exhibitions) was what attracted the families.

Regular visits to exhibitions like Xperiment! may act as a means for vocational guidance. In two of the families, who were quite frequent MSI visitors and Xperiment! had always been their first stop on their itinerary, the children stated that they wanted to

become scientists. It is quite difficult to say how much visiting Xperiment! affected the attitude of these family groups towards science. Most likely it is a series of factors, one of which is the Museum visiting. There is some indication that frequent visits do influence attitude to science such as in the above two cases. Furthermore, as was mentioned above, science as presented in Xperiment! is much more interesting for children than science as taught at school.

5.5.7 Ideas about hands-on museums

Having a strong agenda for learning and with the assumption that what is exhibited in Xperiment! is worthwhile learning about, family groups discussed the interactive dimension of the exhibition in terms of accessibility. The vast majority of the family members appreciated the nature of the exhibition which makes science accessible for all ages, especially for young children. The idea of 'doing' instead of just 'looking at' the exhibits seemed to be very appealing and was often related to a basic child need. The phrase used by the interviewer was 'being able to touch' and was contrasted with that of 'not being able to touch'. It was particularly interesting the way people talked about the idea of being able to touch in Xperiment! and the kind of associations they made (figure 5.6).

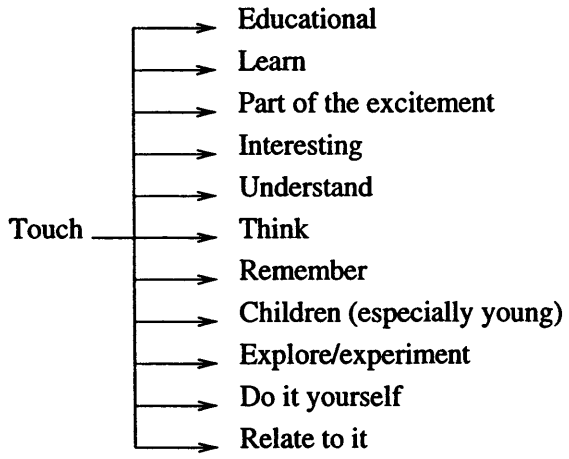


Figure 5.6. *Descriptions of touching.*

Most of them referred to the fact that they could relate to the exhibition both physically and intellectually. This is what, according to these families, made this exhibition and hence science, particularly accessible to their younger members. The physical dimension added to the experience by making it more educational. In figure 5.6, the words which (adult) family members associated with 'being able to touch' are the same as those used to describe the learning process. The same figure can be presented in a linear fashion in terms of action-reaction-outcome (figure 5.7). Presented like this 'being-able-to-touch' appears to have two dimensions, those of space and time.

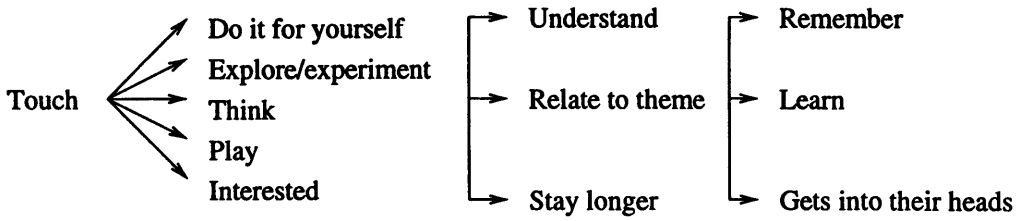


Figure 5.7. *Learning outcomes relating to touching.*

Fourteen family groups talked about the 'doing' dimension of the exhibition in terms of specific short and long-term learning outcomes. Although a lot of the adult family members thought that the exhibition was for both children and adults, they were mainly concerned with what the children could gain out of the visit. Perhaps this is because the exhibition came across as presenting basic scientific principles suitable for children. Yet, family groups seemed to have a specific learning motivation for visiting museums which had a social dimension. Some of the short-term outcomes of bringing children into contact with hands-on exhibits was that they make children think; there was a wider variety of activities from which they could choose and they had control over the things they wanted to explore (self-directed learning); they could co-ordinate their actions to conduct an experiment (kinaesthetic learning) and see the results of their actions; and they stayed longer (the temporal dimension of the exhibition) which was thought to lead to a better understanding of things. Furthermore, since children could get physically and intellectually involved they would remember the experience in the long-term which was thought to assist learning. The following extracts are typical examples of this point:

M: I think it's good to be able to touch. It's a good way to learn; to be able to do it yourself rather than just look at something in a case and read about it and try to understand it. It's much better and you have a better memory of the experience by being able to touch it and do it and see what happens. Each one is like an experiment which you can conduct. I think it's excellent, especially for children. (F2, Q14)

W: The children are actually getting more out of it. When they can touch they learn more whereas when they can't touch they become bored after a few minutes and then they want to leave. (F17, Q14)

One parent compared it with the opportunities available when he was at school:

M: I think it's very good, very educational, not the sort of thing I had when I was at school {laughter}. It's very good this and I shall imagine that school visits really benefit by coming round. It's very good, very good, you know. (F9, Q14)

This statement comprises a nostalgic dimension but also a commitment by this parent to provide his son with better educational opportunities than he had by utilising resources other than the school.

Although, in general, family groups seemed to be quite positive about hands-on exhibits, five of them expressed some concern about the way children often use these type of exhibits. They feared that children might just want to play with the exhibits and not spend enough time trying to understand them. They seemed to think that the exhibits were not self-explanatory and that children needed to read the label as well as touch the exhibit. Alternatively, an adult should explain or assist children with understanding the phenomena:

> M: I think the hands on is much better as long as they {children} understand this is not just a toy, isn't it? 'Push that, get it to work and what's the next thing?'. It's just the action and they want to play with things. I brought her today and I said 'ok, lets understand why' and this one {points at the picture of the delay tube}, we spent a lot of time on it, didn't we, until she understood it. But some of the children, this one {points at the delay tube} they weren't doing it properly and it seemed to explain how to do it. I was telling to her 'put your mouth here and put your ear close to the tube'. But they didn't know what to do. They were just shouting to the tube and then they walked away. (F22, Q14)

For the vast majority of adult family members the ability to touch and experiment with things was closely associated with childhood. A lot of them thought that it is natural for children to want to touch and play with things because that is the way children learn. They seemed to be influenced by educational ideas about how children learn but also by their own experience of visiting museums with young children:

> M: It was good, wasn't it. Some was fun and some were just, some were interesting. I think it's certainly, it's fun for me and it's much easy for me if the children are happy, ehm. But, in general, we've noticed the museums the last couple of years there's definitely a bigger thrust at enabling children to interact with the exhibits rather than just looking at stuff, an aeroplane or a steam engine or whatever it is. I think museums generally, and this one from what I've seen so far, particularly seem to make a much bigger effort, yeah. When the children, well A. is at 6 and J. is only just 8 so they're quite young really. Science at school has only just started. (F6, Q14)

A couple of engineers (doing their PhD research at the time the interview took place) found the hands-on approach a very good learning approach and quite realistic as well. It is something engineers often do to solve problems.

Seven family groups found that physical accessibility and the variety of activities (spatial dimension of the exhibition) gave them a sense of freedom. One of them put it very explicitly:

M: It's nothing to stop you. You can go in there and try everything. (F13, Q14)

Others (9 families) compared hands-on exhibits favourably with static exhibits which you can look at or read about. They often used the words 'explore' and 'experiment' to describe the kind of experience that they had with the exhibits in Xperiment! They liked the idea of being able to 'figure out things for themselves', of being given the opportunity of making their own meaning out of the experience. They preferred being able to touch to looking or reading:

B1: {This is} better because you can touch it instead of just looking at it and being bored. (F27, Q14)

M: I think museums where you can't touch things are very boring really.
G2: Yeah.
G1: Yeah, the kids are not interested, are they?
M: Yeah.
G2: Right.
G1: They have all these glass boxes and you can't touch anything. It makes it boring for the kids while when you have like in this Xperiment! thing here you can touch it. But if you have to read about how it works the kids, they won't read that. I find that this one Xperiment! is interesting but, you know, the ones where you can't touch and you can't (...) that's boring. (F18, Q14)

Only three family groups mentioned that they preferred or tended to visit hands-on rather than traditional museums. A few families found that museums nowadays do try to be more child-friendly and have introduced hands-on exhibits in their existing exhibitions. Another four groups thought that the ideal for a museum would be to have a mixture of different media for communicating with its public. In this respect, they found the MSI was a good example as there is something for everyone. Not only does the Museum use a whole range of communicative media but it also presents science and technology thematically throughout its exhibitions. This leaves space for visitors to make their own choices and comparisons between different sections.

Others (5 groups) felt that there is a place for both hands-on and traditional museums as different visitors have different needs. One of them thought that museums need to have hands-on exhibits because there are appealing to children but she would not have visited Xperiment! if she had visited alone. Another adult family member mentioned that he would not necessarily have expected to find hands-on exhibits in a museum. Nevertheless, he welcomed the idea. There was one family where the adults had a strong 'prejudice' against 'modern' museums, as they said, because there was too much emphasis on having fun rather than on learning. On the other hand, their daughter liked them for the exactly the same reason. This is what the mother said:

M: We have different views on that part {laughter}. Well, I basically have a prejudice against modern museums. I feel that they do not give children credits for any intelligence and that they try to make things much, the emphasis is on fun. (F8, Q14)

This is what her daughter thought:

G: I prefer museums like this because you get to have fun and play around with the stuff and it's sort of if you do something then, and if you went to other parts you might remember a bit more about this because you get sort of doing things instead of just being able to look at them, and be able to understand more. (F8, Q14)

And this is what her father replied to that:

M: You've bought the nonsense of modern education {laughter}. (F8, Q14)

This was the only case where visitors felt so strongly against hands-on museums. However, there were a couple more cases where visitors referred to this type of museum as 'modern' and the traditional museums as 'old-fashioned' and 'proper'. Another adult family member associated museums with things that are 'dated'. Thus, the emphasis was more on museums that present a historic overview of the subject matter.

One adult family member suggested that hands-on exhibits should be incorporated into existing exhibitions where children would be allowed to make direct comparisons. He felt that simple demonstrations of phenomena do not help children reach that level of understanding. This is an interesting suggestion since one of the objectives of the exhibitions is to help visitors make links with the existing exhibitions in the Museum.

5.6 Conclusion

The MSI in Manchester seemed to attract more male visitors in family groups than women. However, there were slightly more girls than boys in the groups. Adult visitors in the age range 35-44 or 55+ accompanying primary school children made up the largest family visitor groups. Although more than half of the adult family visitors had had the minimum education, they were interested in science and technology. The vast majority of them worked in industry in areas related to the Museum's exhibitions. The above discussion also highlighted the significance of the motivation of the family groups in visiting the MSI. The Museum attracted families for more than one reason. Family visitors seemed to see the MSI as a predominantly educational institution. Learning individually and as a family was a major motivation for visiting. Learning was seen by a lot of adult family members as a process which takes place throughout one's life. Having children of primary school age seemed to be an incentive for the adults to visit museums or other cultural institutions. This attitude was much stronger among adult family members who had visited the MSI

or other museums when they themselves were children or with their own children in the case of grandparents.

Planning the actual visit seemed to depend very much on the previous visits of the families to this or similar museums. The fact that they were visiting a science museum and other information about the Museum (recommendation or publicity material) influenced the families' agendas of the visit. Family groups who were regular Museum visitors and knew the place well seemed to have a quite fixed agenda as compared to the rest of the family visitors. However, the agendas of the families were not static. They were constantly negotiated among family members. They could also be challenged by the Museum agenda as family groups (even those with a fixed agenda) were happy to accommodate new things which the Museum offered into their visit plans. In some cases, the agenda of the Museum challenged the agenda of the group where it exceeded their expectations or challenged their attitude towards science: both the adult and child family visitors mentioned that they did not expect to find such a colourful gallery like Xperiment! which made science 'fun'.

Another important feature for the image of the Museum seemed to be the hands-on approach employed by Xperiment! Furthermore, the fact that the Museum uses a variety communication techniques seemed to appeal to a wide range of family audiences. Family members felt that there is something for everybody to do and that the exhibitions met their needs both individually and as members of a social group. An interesting point was that of the grandparents, who denied any motives of their own for visiting the Museum. Instead they emphasised the social aspect of the visit as well as the opportunity to develop a relationship with and to transfer information on family history to the grandchildren. Many children wanted to visit the Museum with their family and persuaded them to do so. They also expected to go to Xperiment! during their visit to the MSI and to be able do their favourite 'experiments'.

Addressing their social agenda, adults made an effort to affect children's educational experience even during the interview by stimulating an exchange of information about the exhibits. This type of behaviour differed according to the age of the children and their willingness to respond. There were two alternative reconstructions of the visit: one based on the actual observations of the action/reaction at the exhibits; and another one which provided an explanation of the phenomena using abstract language. What was striking was that the children who could provide an explanation were quite young (below reading age) and their ability sprang from the social interaction within the family groups. In the case of the adults, the ability to abstract related to higher education and special training.

Although the vast majority of the adult family members found hands-on science quite accessible, especially for young children, a lot of them thought that it is not equally accessible in everyday life. However, they thought that it is important for their children to be scientifically literate and to develop or follow up an interest in science. Many of them

believed that children learn by touching and playing with things. The hands-on science approach was seen as fun and educational at the same time. It stimulates a lot of thinking (it is minds-on) and makes the experience memorable. Moreover, it gives visitors a sense of freedom to explore at their own pace. However, a few adult family members expressed a concern that children could treat the exhibits as 'toys' and would not read labels.

Summary Xperiment! is a 'science-centre' type of exhibition. The hands-on approach is what attracted the families and it was considered an important aspect of the Museum's image. It adds an educational dimension to the exhibition while it makes science accessible and 'fun'. Learning was included in the agenda of the vast majority of the adult family visitors. There were differences in the personal and social agendas of the children and adults. In addition, there were differences between the agenda of the parents and that of the grandparents and other relatives. The family agenda was mainly influenced by previous visits and by information about the exhibition provided prior to the visit. There were different agendas, based on the families plans for the visit, ranging from open to fixed. However, they were negotiated between family members during the visit and were challenged by the Museum's agenda.

The organisation principles and the themes of the exhibition are not clearly marked. The exhibits are presented out of context, they are not explicitly linked with exhibits in other Galleries or related to everyday life. The interpretation provided is not consistent neither are the main messages reinforced. There are no support material (except for the labels) for families who also do not benefit from the social interaction with the explainers. Adult family members – especially parents with young children – tried to play the role of an explainer for their children. These therefore made the Museum agenda less clear and less likely to influence the family agenda. This was manifested by the way the exhibitions were perceived and reconstructed by family visitors. Their preconceptions and ideas about the exhibition and its theme, and the communicative approach dominated families' reconstructions. Hence, although these reconstructions were clearly related to the content of the exhibition they did not always reflect the messages which the exhibition team intended to communicate. Family visitors from a higher educational background were more likely to reconstruct the exhibition in abstract terms or in terms of what the underlying principle was. The communicative approach seemed to influence the reconstructions of the exhibition. By focusing on the hands-on dimension of the exhibition, a large number of family visitors reconstructed it in terms of 'how things work'.

Chapter 6

Case Study II: Eureka!

6.1 Introduction

This chapter presents the second case study, Eureka! the Museum for Children. In this case, 29 family groups were observed and then interviewed. The discussion is based on these data and aims to present the ideas and experience of the family groups before and during their visit at Eureka! It begins with the families' profile: gender, age, educational and socio-economic background (section 6.2). These are factors which influence the family agenda and, hence, the family museum experience. Their ideas about the visit develop before the family members visit Eureka! and are culturally determined. The reasons they visit Eureka! and the information family members have about it, their plans and the personal and social context of the visit also influence the agenda of the family group (section 6.3). Then, section 6.4 will try to reconstruct the family visit to Eureka!

One of the reasons for studying family groups in three different institutions was to explore how family agendas differ, where they are similar and how they affect the family visit. It is hoped that this comparison will show the interrelation of all the factors that influence the family agenda and how they can produce different patterns when museum visiting is done in a different framework. In the following discussion, comparisons between this and the previous case study will be made where possible.

6.2 Family profile

Twenty-nine family groups were observed and then interviewed at Eureka! Only, 28 of them are included in this study due to the poor quality of the sound in one of them. This gives a total of 85 family visitors. Forty-one of them were adults, one was a young adult and 43 were children. Hence, almost an equal number of adults visited as did children[1].

[1]This finding is supported by market research carried out by Eureka! to determine the profile of its visitors (Eureka!, 1993f, 1994a).

Among the adult family members, 24 were women[2] and eighteen men (table 6.1). Similarly, 24 of the children were girls and nineteen were boys (table 6.2). There were fourteen single adult family groups, nine of which included women and five of which included men (table 6.3). The inverse proportion of men-women was marked in the case of the MSI. Moreover, less family groups consisting of grandparents were observed and interviewed at Eureka! as compared to the ones at the MSI[3].

women	24
men	18

Table 6.1

Gender and number of the adult and young adult family members.

girls	24
boys	19

Table 6.2

Gender and number of the child family members.

women	9
men	5

Table 6.3

Single adult family groups.

As seen in table 6.4, almost two-thirds of the adult family visitors in this study were between the ages of 25-44[4]. Half of the children were of the age range 9-11. Of the rest, almost one-third were quite young children (0-5 years old; table 6.5). Compared to the MSI, Eureka! is visited by more children of the age range 0-5 years old (almost double this number). In total, more than two-thirds of child visitors are aged between the targeted age group (5-12). This age group is also over-represented in both visitor surveys carried out by the institution (Eureka!, 1993f, 1994a).

More than one-third of adult visitors were from higher educational background[5] (university degree; table 6.6). This is double that of adult visitors at the MSI. Thus, it seems more adult visitors at Eureka! were from the middle-class and were better educated compared to the visitors at the MSI. What is interesting is that one-third of the adult family members to Eureka! worked in areas such as education and health care. As was mentioned in the case of the MSI, the occupations of some of the visitors to Eureka! reflect the image

[2]Both 1993 and 1994 visitor survey reports state that women visitors constitute more than half of Eureka!'s adult visitors.

[3]There were five such groups compared to nine groups at the MSI.

[4]This age range consists of 77% of the adult visitors (Eureka!, 1993f, 1994a).

[5]More than half of Eureka! visitors come from higher educational background (Eureka!, 1993f).

16-24	4
25-34	11
35-44	19
45-54	1
55+	7

Table 6.4

Number of the adult and young adult family visitors by age.

0-4	10
5-11	30
12-15	3

Table 6.5

Number of the child family visitor by age.

of the institution (i.e. commitment to children's learning) and also the subjects covered by its exhibitions (in this case the one on health education in My and My Body).

Minimum	10
Stayed on at school	11
Undergraduate degree	7
Postgraduate degree	10
Still in full-time education	4
Total	42

Table 6.6

Educational background of the adult family members.

Slightly more than half of the adult family members (24 visitors) were from the C1 socio-economic background (table 6.7). The rest were from the B and C2 (6 and 5 visitors respectively) while only three were from D and E socio-economic background. This finding is supported by the Annual Visitor Surveys (Eureka!, 1993f, 1994a). Only two of the families included members from an ethnic background[6].

From the above discussion, it seems reasonable to claim that the family groups who took part in this study were typical Eureka! visitors.

6.3 Socio-cultural patterns

This section refers to the families' motivation for visiting Eureka! This relates to the different ways Eureka! is used and perceived by its visitors in their social life and is

[6]They constitute only 2% of the visitors (Eureka!, 1993f).

Women		Men	
A	0	A	0
B	4	B	2
C1	14	C1	10
C2	1	C2	4
D	1	D	1
E	0	E	1
Homemaker	3	Homemaker	0

Table 6.7

Adult family visitors by socio-economic status.

compared with the way the family groups perceived the MSI. It also includes practical concerns of the family groups.

6.3.1 Why visit a hands-on museum?

Family groups who chose to visit Eureka!, The Museum for Children, expected it to fulfil specific personal and social needs, as it was the case for the MSI. They expected it to be a place designed to meet children's needs and that they would be able to touch the exhibits. Given that it is the only Children's Museum in Britain and consists of hands-on exhibitions only, it can be expected that there will be differences in the agenda of the family groups visiting Eureka! compared to those who visited the MSI in Manchester.

The vast majority of the family groups specified more than one reasons for visiting Eureka! Here are some typical responses:

> M: We've heard about it and we've seen it passed a few times and it was his birthday yesterday and we've mainly come so that we mess about with and this is a hands-on museum. So that's why we came here. We've seen it a few times. I've passed a few times. We live in Bradford. {...} It's just something we wanted to do, ehm, and just have a good day – practical on one – I like to know how things work, and have a go with things. It's just practical. (F8, Q1,4)

> W1: It's a Children's Museum where they can play and do what they want to all day, and it's in West Yorkshire which is handy because we live in Huddersfield. So it's really handy for us. We thought we'd better take her some place where she could play so we brought her here. (F25, Q1)

Only in two families did the adults mention a single reason for visiting. In both cases, they were first time visitors accompanying very young children (2 1/2 and 3 years old) and were not sure if it was suitable for them. It was just an exploratory visit.

There were quite a few children (in 13 groups) who persuaded the whole family to visit Eureka! Five of them provided their reasons for visiting on behalf of the group, compared to just one at the MSI. They mainly referred to the fact that they could touch the exhibits and enjoy themselves:

B1: Because my friend's been and they said it was really good so we came.
{I: what did your friends tell you about Eureka!?}
B1: Well, it was mainly about trying things and things that you could push. (F12, Q1)

B: I like it because there's a lot of things that you do like these sort of things, touch things instead of my mum saying 'no, no, no, no, don't touch!' (F15, Q1)

In another six groups, both children and adults mentioned their own reasons for visiting. Some of these children had been before or another child member of the family had visited and told them about Eureka! Others had heard about Eureka! from friends of theirs who had been and enjoyed it. In both cases, however, the children's motivation for visiting was again the hands-on aspect of the exhibitions and to have fun.

In two families the adults mentioned that the main motivation was that the children wanted to visit while adult family members in ten groups said that, although it was their decision, they visited Eureka! for the children[7].

It seems that children are more in control of the visit at Eureka! than they were at the MSI. They are more likely to be the decision makers, to influence the rest of the family in deciding to visit and to respond to questions about their motivation for visiting[8].

Having explored the variety of reasons for family groups visiting Eureka!, the discussion will now turn to the more structured ways they described their motivation, thus revealing Eureka!'s place on a number of cultural itineraries.

6.3.2 Cultural itineraries

Family members described their motivation for visiting Eureka! in different ways. The dominant itineraries are slightly different from the ones relating to the MSI. The itineraries identified were, according to frequency of occurrence: education; entertainment; family event; place; and life-cycle.

Education itinerary (21 out of 28 family groups) The majority of the adult family members described their motivation for visiting Eureka! in terms of learning. Education seemed to be the major motivation for family groups in visiting both Eureka! and the

[7]A day out for the children was the most common reason family groups visited Eureka! This is based on studies carried out by the institution (Eureka!, 1993f, 1994a).

[8]The 1993 Annual Visitor Survey (Eureka!, 1993f) revealed that children are the ones who make the decision to visit Eureka! next often to women, that is 22% of the time.

MSI. As in the previous case study, education can be divided into two categories. The first category relates to a more specific interest in science and technology. The second one relates to a more general interest in learning through experiencing things and in life-long learning. In the second category belong many family members who particularly referred to the learning-by-doing approach adopted in the exhibitions at Eureka! In a few groups, some adults fall in both categories as they related the experience to specific short-term learning outcomes but also to long-term ones deriving from visits to Eureka! and similar activities.

Some adult family members (in 10 groups) indicated their interest in the subject of the exhibitions, that is science and technology. In two of these cases, the adults actually mentioned that they were thinking of the children's learning at the same time. They felt that it would be useful for the children to be able to see and touch exhibits related to science and technology. Another four adults mentioned that they had a personal interest in science and technology which related to their professional interests. They either had science background or – in one case – worked as electrician. The following quotes are typical examples of the above point:

> M: Well, I mean, I work, do electrical stuff, and it's very practical so I like practical things. And I like to know how things work and I think there's more to it than just pressing buttons; there's more to it and the more you learn the better it is. (F8, Q5)

> M: We thought we would come and see the exhibitions because both of us are interested in science and I think it's good for the children to come along and see something like this. So we've come to see this one because I think it's very good for the children to come and try things, hands-on things, to try and make things work. (F11, Q4)

> W: We're self-interested in science and how to communicate science to younger people. (F26, Q1)

A few adult family members mentioned that they had noticed their children's interest in science and technology (or as they put it 'how things work') and they wanted to build upon that interest.

As was mentioned above, most of the children who indicated what their interests were mainly referred to the approach used in the exhibitions at Eureka! (9 children out of 11). There was a variety of exhibits which they could 'try out', 'play' and 'mess with', and have fun. Two of them, in particular, mentioned what they could gain from the experience in terms of learning. They both were frequent Eureka! visitors and referred to examples from their learning experience with specific exhibits:

> B: And also because it's got the Workshop {refers to the Factory} and there's lots of things that you can (...), well, it teaches you about things like if you were going

to (...) ehm, in a technology, ehm, (...) somebody who works in a factory then it teaches you about how one works in a factory. So you can learn something about it. You learn things that are interesting. (F15, Q1)

G: To learn.
{I: what would you like to learn?}
G: Going in that House there're things to do like cooking. (F21, Q3)

Adult family members in eighteen groups described their motivation for visiting in terms of education or learning in the broader sense of the term. Most of them (13 groups) focused on children's learning while the rest expected the visit to be a learning experience for the whole family. No children saw their visit in terms of general learning. Only a few (3 children) mentioned that they expected it to be 'good' either because they had been before or because friends' of theirs told them so. They could not be more specific as to what they meant by 'good'.

Some of the terms[9] adult family members used to describe the experience they expected are quite similar to those used by the family visitors at the MSI. Some new ones were also used such as 'to communicate', 'to teach', 'to explore' and the idea of 'getting reminded of things you've learnt but you have forgotten'. They also used terms such as: 'learning/to learn' and 'learning through experiencing', 'educational' (referring to the experience), and 'understanding'. Quite a lot of family members (in 10 groups, and both adults and children) mentioned that they expected it to be 'interesting'.

Thus, a lot of the family groups interviewed perceived the exhibitions in Eureka! to be related to science and technology and to be educational and particularly accessible to children. They also felt that the hands-on approach adopted by the institution enhances children's understanding of how things around them work. Here are some typical examples of this point:

M: Well, we just hoped that we'd be able to actually do things, that we should take in more as opposed (...) There're not things that you see in a museum you can actually experience it yourself and I think you're learning a lot easier and we hoped that, you know//
W: //Some of it would be fun and some would be retained.
M: That's right. (F16, Q5)

M: We expected them to be, ehm, we thought they'd be interested in some things, some things more than others in particular. They might want to ask some questions or explore an area a bit more and come away with just some better ideas about how things work. (F26, Q5)

[9]As was noted in the previous case study, the interviewer did not use the term education or any synonyms.

In one family group the adults expected it to be educational for their child but they were surprised to find out that it was educational for them as well. Another three adult family members thought that the visit would reinforce school learning. They felt that the children would have a better memory of things when they experienced them. This was what, according to one of them, made learning at Eureka! more interesting than school learning which he considered to be boring.

For some adults (4 people) learning was a life-long activity and visits to Eureka! or similar institutions brought them in contact with new technology in particular:

> M: I liked this (...), lots of things I'd like to know like how things were like, like communication, satellites and things like that. I mean, when I was at school we'd learn how things work and what's inside, at school. Technology has gone so far you have to find out for yourself if you want to know what's there. Places like this help. (F4, Q5)

Some adult family members (in 5 groups) believed that whatever one does helps one improve one's skills and involves learning. Thus, they seemed to believe that visits to Eureka! enhance children's learning. One of them particularly referred to the social aspect of the learning experience:

> W: And I think, I think, ehm, he will learn, although he doesn't realise it, I think he's learning while he's here. It's the actual experience and the exhibits are so well done and it's the speech as well, isn't it? He'll go home and tell his daddy and mummy about it. It develops his speech but above all it's just enjoyment. I mean, he's learning all the time, isn't he? (F7, Q5)

As was noted in the case of the MSI, family groups in Eureka! seem to have a strong learning agenda. They visit Eureka! because they expect it to meet both their short- and long-term learning needs.

Entertainment itinerary (16 out of 28 family groups) Entertainment seems to be one of the main reasons why the family groups visited Eureka! It is part of the agenda of the whole group, children and adults' alike.

Half of the families had visited Eureka! before and had enjoyed it. Hence, having the last visit as a point of reference, they expected to have a good time again:

> W: We've been before and really enjoyed it. (F1, Q1)

> W: Well, we live here, we live in Halifax and the children wanted to come.
> G1: Because it's fun. (F2, Q1)

> W: {...} we knew we'd have a nice time when we got here. (F15, Q6)

In a few cases (5 groups), entertainment was linked with learning since a lot of the parents felt that when children enjoy themselves the experience becomes memorable:

W: {...} if they come along and enjoy it they'll remember it. (F11, Q4).

W: I just expected the children to really enjoy it and gain some more understanding about how things work. (F3, Q5)

M: Just have an open, enjoyable day. I was hoping that S. would learn something. (F17, Q5)

However, children did not always agree with what adults expected them to do:

{I: what did you expect to do or to see in Eureka!?}
G: To have fun.
M Did you want to learn anything?
G: No.
M: Not really, you like touching things.
G: Yeah. (F17, Q4)

What seems to be important was that Eureka! met the expectations of all family members because, as was the case for the MSI, it does not offer an 'either or' experience. All family members who expected the visit to be entertaining mentioned other reasons for visiting as well. Thus, it seems that entertainment is an important part of a family visit but, at the same time, it is not enough to make it a successful one.

Family event (12 out of 28 family groups) Eureka! was seen as a family event by some family groups. Having time off and doing something which all family members would enjoy, were essential for this itinerary. Most of these family groups visited on school holidays and weekends and also to celebrate special days such as birthdays.

Adults saw it as spending quality time with their children doing something special which interests all of them. The following extracts are typical examples:

W: Hmm, for all of us really, yeah, like a nice day out on a Sunday.
G1: Yeah, a nice day out.
W: It's exciting isn't it? (F10, Q1)

W: It seemed to be a family thing as well. So we thought it would be worth coming. (F13, Q1)

W: And we came today because I work full-time and so I try to do something at the weekends and we don't live too far. We live in Bradford which is about twenty minutes in the car to come. (F20, Q2)

Some times (in 4 cases) having a 'day out' with the family was associated with special occasions such as when grandparents got together with their grandchildren or to celebrate birthdays:

> W: Yes, we don't live far away but he likes to come and stay with me. It's all part of the day out. He wants to stay with me, not with his mum and dad, with me. (F7, Q2)

> W: Well, R., it was R.'s birthday a few weeks ago and she's got her birthday money and with her birthday money she wanted to come here. That's why. (F21, Q1)

On some occasions (cf. section 6.4.2) spending a day at Eureka! may act therapeutically for some types of non-conventional families.

Place itinerary (9 out of 28 family groups) The place itinerary had a local dimension in the case of the MSI. In this case study, a visit to Eureka! was associated with visits to relatives living locally or was seen as the number one venue to take a child visitor.

For three adult family members a visit to Eureka! had been 'on their list' of places to visit as part of their holiday in the UK or in the North of England. In this case, they combined a visit to Eureka! with visits to other similar tourist attractions:

> M: We've heard about it through the national press. We're on holiday, we stay in a caravan. It's twenty miles from here so it is an ideal opportunity because it's quite a long journey from home. We come from Cumbria. (F13, Q1)

> M: We've see an ad some time ago, I think, in a newspaper when it first opened. Ehm, it's been on the list to have a look at for some time. We combined it with yesterday's visit to the N. M. P.T. We've been to a number of places. There's one in B. and there's another one, the S. P. in L. We've done those in the last few months or the year before. (F26, Q1)

One of these family groups were actually from over-seas visiting relatives who suggested they visit Eureka! In this case, the place represented was not Halifax but Britain. Eureka! was only one of the venues visited by the same family group during their stay in this country.

The place itinerary also comes in operation when children visit relatives who live locally or when people who live in the area have guests, in particular younger children. For some families it became part of the 'family tradition'. Children may have implied that they wish to visit Eureka! while staying with relatives as was seen in the case of a 10 year old boy visiting his grandmother. For adults with child guests, a visit to Eureka! or other places seemed to be part of the whole experience something that adults and children could do and enjoy together:

W: And my grandson was staying with me. It was another thing to do and he likes doing things, don't you?
B: Yeah.
{I: Did you visit Eureka! for him?}
W: Oh, no. I like museums and we're already been in the Y. M. in Y. and the C. M. and we've tried the T. and we've visited relatives these last few days. (F18, Q5)

W: Well, he's here for the day and we just decided that we were going to come. He's just staying with me for the day. So we decided after we knew he was coming, yeah. (F1, Q2)

Eureka! was also chosen as a good place to visit by two family groups where the members were building a relationship. For a step-father Eureka! was the ideal place to bring his step-son, who had wished to visit for some time, and 'to get a bit closer and have a good time together'. In the second case, a man visited his 17 year old grandson and his 5 year old daughter:

M: My grandson lives locally and he showed us where it was. We have come from near York and we're on a visit to see L. and we, so we thought it would be interesting to come and see Eureka! at the same time. (F14, Q1)

What characterises both cases, is that the place (Eureka!) is used for social and therapeutic reasons. It represents a neutral environment[10]. Members from the same family can get to know each other better and built family ties.

Life-cycle itinerary (6 out of 28 family groups) In this case study, life-cycle was not as significant as for the family groups who visited the MSI[11].

Here again having children or grandchildren of primary school age was one of the reasons for visiting museums. It was seen as an activity closely related to one's childhood which can be repeated at different stages in one's life. Given that Eureka! is a relatively new institution, visitors referred to their previous visits to similar institutions like science museums or science centres:

M: We went to the science museum[12] in L. some years ago but, of course, they were very young then, but D. really enjoyed playing with planes and things like that. So we've come to see this one because I think it's very good for the children to come and try things, hands-on things, to try and make things work. (F11, Q4)

[10] In many respects it resembles the approach used by child psychologists.
[11] Twenty-two family groups out of the 29 mentioned it at the MSI.
[12] Refers to quite a large science museum with both static and hands-on exhibitions.

W: Ehm, well, I've taken my son before to the S. M.[13] in L. and I suppose (...) I think I've been twice; we went again two years ago. Well, and in the S. M. there's lots to do and that was a lovely day out. So I think I thought it might be similar. And my grandson was staying with me. (F18, Q5)

W1: Because we heard it was very interesting for children and we came here several years ago when H. was very small and she was too young really then to appreciate it all. (F24, Q1)

Having had a pleasant museum experience with one's children or grandchildren is one of the factors which encourages family groups to go to a particular museum or a similar one again.

Families visited Eureka! because of its place on a number of different itineraries. The number and importance of each of these itineraries can influence visiting patterns.

6.3.3 Planning the practical side of the visit

Factors such as the weather, proximity, the time of the visit and crowded conditions in the exhibition space as well as the entrance fee seemed to be taken into consideration during the planing stage of the visit. The latter two factors also tend to affect the frequency of visit to Eureka! Furthermore, most of the family groups planned to spend the whole day in Eureka! as opposed to the family groups at the MSI where the majority planned to spend a couple of hours in the Museum.

Eleven family groups mentioned that they had considered the practical side of the visit when planning for it. Five of them referred to the distance between Eureka! and where they lived. Family members in two groups said that the fact that they live close was an added reason for visiting. Another group felt that the location of Eureka! (next to the train station[14]) was convenient while two other groups combined the visit with a holiday in the area.

Two families chose to visit Eureka! because it was raining. Another two mentioned that they were hoping that it would not be very crowded. This was why one group decided to visit during term time, hoping that it would be quieter than the last time they visited. A couple of adult family members referred to the entrance fee. One said that one of the motivations for visiting was that children under the age of 4 are admitted for free. In contrast, the other one said that, although she wanted to take her grandchildren to Eureka! every time they stayed with her, she found it very expensive[15].

Time constraints did not seem to be an issue in the case of Eureka! since many families

[13] Ibid.

[14] Twelve percent of the visitors used the train (Eureka!, 1992f).

[15] She thought there should be a concession for old aged pensioners.

visited for the whole day[16]. This was evident in the case of one family's programme which was influenced by the physical characteristics of the institution itself. As one family member put it:

> M: We just, we didn't, we knew it was a big place and we came to spend the day and, you know, have a good look round. (F22, Q3)

More than one-third of the groups consisted of family members not living in the same house and, in many cases, not even in the same city. These groups consisted of grandparents and their grandchildren, and of uncles or aunts visiting with their nieces and nephews. Arrangements had to be made for the family members to meet and go to Eureka! together. In all but two cases (where the members of the families lived quite close) the children stayed at their relatives' the night before the visit. Such arrangements were made by both first-time and frequent visitors.

A further eleven first-time visitors came from other cities in the North of England or even further away[17]. They, thus, had to plan the entire journey including the practical side of the visit. The adult family members faced at least some of the following questions: how to get to Halifax; where Eureka! was; what times and days it was open; where they could eat; and how much it would cost them. If they took the train or bus they also had to find out the time-table for the outward and the return journey. These types of questions were one of the main concerns of the first-time family groups. Families who had been to Eureka! before were quite familiar with the place, the opening times and the entrance fee.

Having identified the issues of concern[18], an adult family member (usually a woman) would call the Tourist Information Office, the train or bus station or Eureka! directly and ask for details. The next step would be to find their way to Eureka! Some visitors lived near Halifax and had seen where Eureka! was as they were passing by. In other cases, adult family members had seen leaflets of Eureka! and, hence, they had all the information they wanted to for planing their visit.

An important part of a family day out was lunch. This was a concern for first-time and frequent visitors alike[19]. Thirteen family groups specifically mentioned having planned their lunch break before the visit while the rest decided what they wanted to do nearer the time. Having lunch in Eureka! or out was seen as a treat by many family members.

[16] According to a survey conducted by the institution (Eureka!, 1993f), an average family visit to Eureka! is 3 hours and 40 minutes which is quite long considering that the majority of the child family members were between the ages of 5 and 11.

[17] Only two family groups came from Halifax and four more from a town close by (between a quarter of an hour and half an hour drive from Eureka!).

[18] Which actually applies to all kinds of family outings

[19] According to Maslow (in Huberman 1980), people have to satisfy their basic needs, like the needs for food, first. In his theory of fundamental human needs, physiological needs are at the bottom of the hierarchy.

It was part of the day out, adding to the excitement of the experience. For those who decided to bring their own packed lunch, saving money was the main reason.

6.3.4 Frequency of visiting

Fifteen out of the 28 family groups interviewed had never been to Eureka! before [20]. Among these was an Indian family who were visiting relatives in the UK and a further two groups who lived too far away to come more often. In four families there was at least one member who had visited Eureka! before. This was a child in all four cases who had been with friends or on school field trip or birthday party. Another nine groups had been to Eureka! at least twice in the last three years[21]. Seven of them were quite frequent visitors having been to Eureka! from three times to ten times the last three years.

number of visits	number of family groups
first visit	15
repeat visit(regular visitors)	9
repeat visit(at least 1 family member been before)	4

Table 6.8

Frequency of visit to Eureka!

Although it is difficult to distinguish any regular visiting patterns, it seems that families with children from the age range 4-10 are more likely to visit frequently[22]. Children from this age group claimed to have been to Eureka! as often as three to more than six times the last three years.

6.3.5 When was the decision made?

The vast majority of the family groups mentioned that Eureka! was one of the places which had been on their list for visiting for quite some time. As was noted above, most of them had heard about it through word-of-mouth, leaflets, advertisements[23] or saw it in passing. However, it often took them a while until they actually decided to visit. Some families (16 groups) actually specified that they took the decision to visit within the last week[24] (5 groups decided the same day; 6 the day before; and 5 a few days earlier).

[20] This finding is supported by the 1994 Annual Visitor Survey (Eureka! 1994a). According to it, 78% of the visitors surveyed were first-time visitors. The term first-time visitor in this study, however, includes those groups where at least one member had visited before.

[21] The families at Eureka! found it easier to remember how many times they had been since Eureka! first opened.

[22] According to the 1993 Annual Visitor Survey (Eureka!, 1993f), children from the age category 4-5 and 9-10 are overrepresented. The 1994 Annual Visitor Survey (Eureka!, 1994a) reaches a similar conclusion: children between the ages of 4 and 10 were the most frequent visitors.

[23] Word of mouth (47%) is the most common way of finding out about Eureka! (Eureka!, 1993f, 1994a).

[24] A high percentage (65%) of the visitors surveyed by Eureka! staff said that they had also decided to visit within the last week (Eureka!, 1994a).

6.3.6 Why visit Eureka!?

The majority of the adult family members (in 18 groups) saw Eureka! as a place for children. Half the family members (in 14 family groups) mentioned that it was recommended to them by friends of the family [25]. In half of these cases it was friends of the children in the family groups. One of the adult member of these groups mentioned the fact that Eureka! was recommended by another child assured her that her children would enjoy it as well. Another six family groups had seen a leaflet about Eureka! and another six groups had seen an advertisement (TV, newspaper, radio). Eight families mentioned more than one source from which they acquired information. In many cases, this created specific expectations as to what it was available and what the family members wanted to see. For example, the families who had seen leaflets had already created an image of Eureka! in their minds and seeing the exhibits shown in these leaflets was very much part of their agenda.

Furthermore, in the cases where adult friends of the family recommended it, children were identified as the only groups which the exhibitions were for. For example:

> W: We thought it would be nice for the children because a child who came said it was really good, because some time an adult can think differently. But, yeah, so we came. (F11, Q1)

> M: I like touching things but primarily I wouldn't have come on my own. I've come because of her. (F17, Q6)

> M: Oh, it's a new place for kids, isn't it? I mean, they can touch things and play with stuff, you know. So I thought it would be a good idea to bring him down here. He's my nephew. It's been here for more than a year now and before he was too young to come. (F19, Q1)

Only three adults expected or knew from previous visits that Eureka! was for the whole family. Another one said that, although they expected it to be for children, they enjoyed it as well.

As was mentioned above, there were some families (15 groups) where the children either had been before or friends of theirs had visited and encouraged them to come. In most of these cases it was the children who persuaded the whole family to visit. However, the adult members of these families mentioned that they themselves had also found out about Eureka! through different sources at the same time. Whatever the source of information was, for many visitors it was specifically the hands-on aspect of the exhibitions in Eureka! which attracted them. These are typical examples:

[25] This finding is supported by both the 1993 and 1994 Annual Visitor Survey conducted by Eureka! (1993f, 1994a) where half of the visitors mentioned that they had heard about it through word-of-mouth.

{I: Do you remember what your friends told you?}
W: Well, just that it was not a normal type of a museum; that it was hands-on, that children could actually do things in the course of being taken around and having a look – you know, 'this is this, this is something else' – where they can actually come and see and do which makes them more interested. (F16, Q1)

M: Well, we had it recommended to us by people who have been. {...} Because she can play with the things and touch everything. (F9, Q5)

Family groups who had been before were attracted for the same reasons:

W: Why did you come?
G1: There're lots of things you can do and touch them here. (F3, Q1)

W1: It's one of the only museums where you can actually take part and get involved. And I was looking forward to seeing her doing that because museums normally aren't terribly interesting for little ones. (F24, Q5)

Apart from a couple of families who combined the visit to Eureka! with a visit to other venues near the area, the great majority of the visitors had come especially to visit Eureka! Furthermore, most of them had planned to spend the whole day in contrast to a lot of family visitors to the MSI who decided to spend a few hours in the Museum. This might be related with the fact that it was the adults who were in charge of the visit to the MSI and, in most cases, they had a very strong personal interest (agenda) in the subject matter. In other words, a visit to the MSI was for adults as much it was for children. On the other hand, a visit to Eureka! was perceived to be mainly for children [26]. However, there were three family groups who believed Eureka! was for adults as well. In one of these groups, it was actually a child who expressed this opinion:

{I: did you know it was a Children's Museum?}
G1: No.
G2: She heard that it was like it was for older people as well not only for children. (F6, Q4)

Children's learning and enjoyment were two of the major reasons families decided to visit Eureka! The adults' intention of influencing the children's educational experience (social agenda) was also quite strong, as will be discussed below (section 6.4.2).

[26] Twenty-one family groups out of the 28 specified that they had visited for the children while adult family members in only three groups mentioned that it was for both adults and children.

6.3.7 Visit plans

This section examines the types of family agendas which were identified based on the families visit plans. Family members were asked whether they made any preparations, and if they had any specific plans for their visit to Eureka!

Family groups planned[27] to spend the whole day in Eureka! since they knew (or discovered) that the exhibitions would keep children interested and motivated for quite a long time, and there were no time constraints. They also tended to have quite flexible plans and to be quite open as to what Eureka! could offer them. Consequently, there appears to be a different pattern concerning the planning of the visit to Eureka! to that to the MSI. The vast majority of the family groups to Eureka! wanted to visit all the exhibitions. Some of them mentioned that they had planned to see specific exhibits or exhibitions as part of their visit. However, they had not visited Eureka! to see only them.

Two main types of family agendas were identified. One of them consists of families with an open agenda who decided which route they would follow once they arrived at Eureka! These were first-time visitors who had no specific information about the place before the actual visit. The second group consists of family groups with a flexible agenda who, however, planned to see or do some more specific things as part of their visit. These could be families who had been to Eureka! before – or at least some of their members had – or first time visitors who were provided with information and had already created some expectations about what they could find there.

(a) Families with open agenda Twelve families had planned to visit all the exhibitions or, at least, as many as possible. They did not have any specific plans before they came. All of the above families were first-time visitors and were more likely to be influenced by the agenda of the institution. A lot of them saw themselves as 'browsing' through the exhibitions or following the children around, spending more time only with the things that interested them most. Hence, they actually 'planned' their visit as they went along:

> M: We've only actually seen this upstairs section and a small amount of the Communication one downstairs. We haven't seen all the exhibition yet.
> {I: why did you go to the first floor first?}
> M: We chose at random {laughter}. We just saw the stairs and we thought we'll go there. That's how, that's been the reason. (F26, Q2)

> W: When we first arrived there was nobody else up there because we arrived more or less at the opening time and everybody else has gone straight to the things downstairs. So we came straight up here because it would be quieter. She could get to the exhibits

[27] This refers either to plans family groups had before the actual visit or to their planning of the visit on entering Eureka! or soon afterwards.

easily and she could see what was happening, not having to queue which is important for a 4 year old child. (F16, Q3)

{I: did you have any plans before you came?}
W: No, we just thought we could go and see what there was. I think probably another time they would say 'can we see such and such?', because they will know what there is. But because we didn't know which sections there were, we did plan to come in and look at everything.
{I: did you use a map?}
W: No//
M: Not really.
W: //We just wandered around and got from place to place. (F12, Q3)

All of the above families had been given some general information about the nature of the exhibitions in Eureka! from at least one source (usually word-of-mouth). They all knew that they could touch the exhibits although they were not sure to what extent. Thus, their expectations were not subject specific, as it was in the case of the first-time family visitors to the MSI. Above all, they expected to be able to touch the exhibits. Two of these family groups had visited similar hands-on exhibitions which used as a point of reference:

M: It's just, I said (...) we've been to this science museum[28] in M. and we told them that basically it was (...) they've got a hands-on section which they liked a lot and I told them that this was a lot like that but it's only a small section. (F12, Q2)

(b) Families with flexible agenda The other sixteen family groups fall in this category. They all had quite flexible plans. Part of their agenda, however, was to see specific exhibitions or exhibits. This expectation was quite strong in all cases although this category includes both first-time and frequent visitors. First-time visitors (6 groups) had seen leaflets with pictures of specific exhibits or had heard vivid descriptions of exhibits from friends or family members who had been to Eureka! Family groups who had already been wanted to see their favourite exhibits or the new ones or those which they had missed on their last visit.

Although they planned to see specific exhibitions or exhibits their agenda was not fixed. They were quite willing to incorporate other things that seemed interesting. Indeed an important part of their agenda was to see as much as possible on a day out. They also mentioned that they had not planned to see particular things in a certain order. It was more a matter of going around planning the visit usually on arrival and making sure that they would not miss the exhibits they wanted to see. Finding interesting things while exploring the exhibition space was one of the most appealing aspects of the Eureka!

[28] A large science and industry museum with both static and hands-on exhibitions.

experience according to a 10 year old boy who was one of the most frequent visitors (5 visits the last three years):

B: The interesting thing about it is that at home like if you see something on the map, something that you like and you can go there but on the way here you sort of think immediately 'oh, look at this'. Like we were going to the Making Centre {refers to the Recycle Centre} but on the way we saw something else and we stopped and spent about half an hour there {laughter}. (F15, Q2)

For family members who had not been to Eureka! before, hearing about it from other family members or friends who had been had a very significant impact on their expectations. Seeing the particular exhibit that they had heard about or seen in leaflets was a central element of their agenda for the visit. The following extracts are typical examples of this point:

W: A. wanted to see the car {in Hello! Is Anyone There?}.
{I: how did you know about it?}
W: In the leaflet, there was a picture of a car in there.
{I: did you plan to see or do anything in particular?}
W: The Marks and Spencer, we were told about that. That sounds good, the shopping thing. (F9, Q3)

W: Yes, we packed lunch and we asked my nieces and nephew what is nice in Eureka! They told us to see the fax machine, the TV studio and the e-mail. (F23, Q2)

For those who had been to Eureka! before, seeing new exhibits as well as their favourite ones was part of their agenda for the visit. Often, a combination of both was more appropriate since it would meet the expectations of all members of the family group:

B: I thought we might go and see the (...) that thing out there.
W: The Dome outside {refers to the Hazard Dome}. We haven't been in there before.
B: We haven't been in there before.
W: I wanted to see the Human Body {refers to Me and Me Body} again. I like that.
B: Yes, I suppose you're right. I like that. (F15, Q3)

B: I went in the Yacht//
B: Well, we heard of it when it first opened and we visited it so we've been before and we thought we'd come up because they would bring new exhibits and new things. So we thought we'd come and have a look around. (F20, Q1)

Of course, family groups who had visited before were familiar with the exhibitions and the layout and could, thus, orient themselves better than the families who were visiting for

the first time. This was also the case for those groups where some of their members had been before and acted as guides for the rest of the group. Usually, it was the children who determined the route of the visit for various reasons[29] and with the adults' consent. Thus, contrary to what happened in the case of the families visiting the MSI, decision-making seemed to be a child's responsibility at Eureka!:

W: We followed the children {laughter} Where they go, you go. (F2, Q3)

W: Just follow them around and see what they like. R.'s getting into computers but I've never been brought up with a computer so I don't know a lot about them but she likes to play with computers as well. (F21, Q3)

W: To have a look around really. We looked at this one {points at the Eureka! Guide}. T. and T. decided that we would come and look at the first floor so we went there. We haven't been on the ground floor yet. So we went in, we wanted to go in the Factory so I went to the information desk to get the ticket but there wasn't a space until three thirty which means we can't go in. So we went to Me and My Body. (F3, Q2)

There was only one family group where the adults seemed to have planned one part of the visit. In this family the child was quite young (a 2 year old girl) and an important part of the agenda of the adults was to see as much as possible and fulfil their personal expectations[30].

Family members used all the information available to plan their visit. Visit plans were usually made when the group decided to visit or on arrival and were fairly flexible. Although child family members were the main decision-makers in Eureka!, the plan was subject to negotiations between all family members.

6.4 The context of the visit

This section will discuss the personal and social agenda of the family members. The difference between the expectations of adults and children will also be examined.

6.4.1 The personal context

This refers not only to the family members' personal agenda of the visit but also to the particular type of the museum to be visited and to the social context of the visit. Indeed the social aspect of the family visit influenced the personal context of the visit as much

[29]This could be because it was their special day out to a place designed for them but also because they were the only members of the family who had visited before or because they were more familiar with the subject matter of the exhibitions than adults were.

[30]They planned to see Me and My Body exhibition.

as the physical characteristics of the museum. Meeting the personal expectations of each family member was a process of negotiating and accommodating each other's needs and desires into the visit plan of the family as a social unit. Knowing that they were visiting a children's museum where they would be able to touch, inevitably influenced families' expectations of what their visit would involve.

Visitor's expectations As was seen in the previous case study, the expectations of the family members of what they could do or see in Eureka! was very much influenced by previous visits. This includes visits to Eureka! or other hands-on exhibitions. Previous experience, age and position in the family structure seemed to affect the personal context of the family visit to Eureka!

Compared to the family groups at the MSI, there seems to be no significant difference between the child and adult family members at Eureka! regarding their personal expectations of the visit. Both adults and children expected to be able to touch things and some of the frequent visitors wanted to visit specific exhibitions or exhibits. However, the social agenda of the child and adult family members in Eureka! was significantly different from the agenda of the family members in the MSI. This affected the personal agenda of the visit, leading to different patterns between the agendas of the child and adult visitors to Eureka! It will be argued below that this is related to the 'children's' part in the institutions title and also to the fact that this is the only children's museum in this country.

(a) Child visitors in family groups Children seemed to be more concerned with meeting their personal needs and desires than adults. They talked more about what they expected to do or to see themselves rather than as a group. Only in the case of four family groups did the children discuss their plans for the visit with their siblings or their friends. This only occurred in families where a child family member had visited before and wished to share the experience with members of their family and friends. In this case, these children acted as guides for the rest of the group (this is further discussed in section 6.4.2).

Children in 21 out of the 28 groups specified what they expected to be able to do or to see in Eureka! Children in another five groups mentioned that they did not know what to expect as it was their first visit and they did not have any information. Another two children were too young to to understand where they going, according to the accompanying adults.

Children's expectations of what they could do or see in Eureka! varied considerably. Ten children had object-specific expectations. Most of them were frequent Eureka! visitors and wanted to see a specific exhibition or exhibit which was their favourite or had not seen before. The following extracts are typical examples:

M: You've got some favourite ones, don't you?

G: Yeah, the Bank and the Shop {Marks & Spencer}. (F17, Q2)

{I: did you plan to do or to see anything in particular}
G: Yeah, the one about the Body {Me and My Body}. (F4, Q3)

Four children in this group were first-time visitors. They mentioned that friends or family members had been before and recommended specific exhibits. The following is an explicit example of this point:

G2: I wanted to see the person just over there sinking in the water.
M: Archimedes.
{I: how did you know about it?}
G2: Because she told me.
G1: Yeah, I told her when we were in the car. (F6, Q2)

This is how the discussion started according to one of the above children:

G1: She says, she kept on saying 'what's Eureka! like, what's Eureka! like?' all the time {laughter}. And I was saying 'well, it's got a Bank, and it's got where you can go and see what your body is like' and kept on telling her what it's like and then she says 'carry on, carry on about Eureka!' {laughter}. (F6, Q4)

Another child mentioned that he could remember his first visit to Eureka! and that he was very surprised that he could touch everything.

Four others expected Eureka! to be 'fun' or 'exciting' as this was how their friends had described it. Another three children mentioned that their parents, who had seen leaflets about Eureka!, had told them that it was about science and technology.

What was quite surprising was that two children referred to what they expected to learn from their visit or how Eureka 'teaches' you about different things. Moreover, learning in Eureka! was not related to school learning but referred to learning about practical skills such as how to cook and what working in a factory involves. Both of these children were frequent visitors, having been to Eureka! five times during the last three years. Learning was also mentioned by another child who had recently been to a science museum with a hands-on exhibition:

B1: Well, I expected it to be a place where you can touch, smaller one, and the rest was like learning {refers to static displays}. (F12, Q4)

The same child and his brother also mentioned that they did not expect Eureka! to be such a big place. This was also the case for another boy who had been to a similar hands-on exhibition. In both cases, the exhibitions occupied only a small space within a museum where the rest of the exhibitions were hands-off.

It is quite clear that the children did have a personal agenda for the visit which, in many cases, they had communicated to other family members before the actual visit. This is true not only for the frequent child family visitors but also for those who had not been to Eureka! before. More than one-third of the first-time child visitors expected to do or to see something specific during their visit. This number together with the number of the children who had been to Eureka! before and also had specific expectations for their visit, gives a majority of child family visitors (in 18 out of the 28 groups) with a strong personal agenda for the visit. What is interesting in the case of Eureka! is the amount of interest and discussion it aroused between groups of children and adults alike. This and the fact that Eureka! was widely advertised and noticed by many of its audience, affected the expectations of the families considerably.

The child family visitors at Eureka! were concerned with their personal expectations as much as the children visiting the MSI. Yet, what differentiates the child family visitors at Eureka! from the MSI ones is that the personal agenda of the former was not always related to previous visits. The case of Eureka! shows that personal agendas can be affected by advertising, with word-of-mouth being the most powerful of all. Of course, having been to Eureka! or other hands-on exhibitions did affect the expectations of the children and it did so in a rather specific way. In both cases when this occurred, the children expected to find a hands-on exhibition among other hands-off ones. They, thus, seemed to have a specific image of a typical hands-on exhibition, and specific expectations regarding their experience of a visit to this kind of exhibitions.

(b) Adult visitors in family groups Adults' expectations of a visit to Eureka! were child-oriented. Adult family members in 21 groups claimed that they were concerned with what the children, rather than themselves, would gain from the visit. Some (in 12 groups) added that once they were there they did expect to be able to do or to see specific things. In total, adults in 21 out of the 29 groups specified what their expectations of the visit were. The rest either said that they came for the children and did not have any personal expectations or that, since they had not been before, they did not know what to expect.

Adult family members (in 10 groups out of the 21) had general expectations of their visit. They said that they wanted to see all the exhibitions in Eureka! All of them except one had not been before but had heard about Eureka! from different sources and wanted to form a personal opinion about it. In five of these groups, the adults mentioned that they visited for the sake of the children. Adult family members in four of these ten groups mentioned that they expected to see specific exhibits as part of their visit. They referred to those exhibits that friends and other family members had suggested they see or they had seen in leaflets. As mentioned above, the vast majority of these adults let the children in the groups make the choices during the visit.

Quite a few adult visitors (in 8 groups) expected to be able to touch the exhibits or at least some of them. They all were first-time visitors whose friends recommended

Eureka! emphasising the 'doing' aspect of the exhibitions or had heard about it from other sources. This is something that attracted adults and children alike and it is a very important feature of the image of Eureka! These quotes are typical examples of this point:

> M: We expected to see very much the kind of things that we've seen//
> W: //Yeah.
> M: //things that you can try, hands-on, children can try out. (F26, Q3)

> M: It's just something we wanted to do, ehm, and just have a good day, practical on one (...) I like to know how things work, and have a go with things. It's just practical. (F8, Q4)

> W: We didn't really know. It was just what we read on the leaflet, wasn't it? And some friends had told you that there was going to be lots of things to touch and see. (F10, Q3)

> {I: did you expect to do or to see anything in particular?}
> W: I didn't expect it to be as big. It's very big and there's lots and lots of 'touch' things. I didn't think that we would be able to touch all the things. (F10, Q3)

Another woman mentioned that it was the hands-on element of the exhibitions that persuaded her to visit with her grandchildren in the first place:

> W: It was my cousin who told me about it. She just said 'there's a Museum that's opened, it's marvellous for children because it's a do-it-yourself Museum and the children can do whatever they, well, they're partaking of the events'. And I didn't really know what to expect when I came the first time. {...} She said that there was a car that you put petrol in it, you see, so I knew that it was the right thing for them when I brought them the first time. (F27, Q7/8)

A small number of adult family members (in 4 groups) seemed to have a subject-specific agenda. They expected to find exhibits related to science and/or technology. All four of them had not been to Eureka! before but they had seen leaflets advertising it. In three of the groups, the adults mentioned that their interest related to their educational background. Another thing that these adult family members had in common was their wish to communicate science to the child members of their group.

The adult in the other group found Eureka! and similar institutions excellent places for self-directed learning. He particularly mentioned new technology because it has advanced so much since he left school and he wanted to keep up to date with modern technology. Life-long learning was therefore an important element of this adult's agenda.

Gaining knowledge on how things work was what another adult expected from his visit. He visited with his 3 year old nephew and was concerned with what his nephew

could learn as he thought he was quite young for a lot of the exhibits. He saw the visit as a good way of keeping his nephew occupied and for him to learn and do things which were not available when he was a child:

> M: To look all the exhibits and spend more time with some of them. I wanted to see all of it, yeah, definitely. I mean, basically, when I was younger there was nothing like this. It was like 'oh, what a mess'. You can do anything you want in here and mess around a bit. (F19, Q3)

As was seen in the previous case study, grandparents denied having any personal expectations. The same response was also given by a lot of the parents at Eureka! The difference, however, between the grandparents and those parents at Eureka! is the actual wording of the response. The grandparents' responses were similar to those of the grandparents at the MSI. They had not even thought that they could gain something from the visit. What seemed to be important to them was being with their grandchildren. On the other hand, the parents did not deny any motives of their own but they were much more concerned with their children's educational experience.

Providing children with opportunities and choices, seems to be a major part of the adults' agenda. The vast majority of the adult family members at Eureka! expressed their personal agenda in very different terms to the adult visitors at the MSI. The latter expected to find things that would relate to their personal interests or hobbies or things that they would be interested to learn about. Affecting the educational experience of the children in their group was one of the concerns but not the only one. They were equally concerned with their Museum experience. On the other hand, for the adult family members at Eureka!, everything seemed to be filtered through the social nature and purpose of the visit.

Factors influencing the personal agenda In the case of the MSI, it was shown that previous museum experience of family groups influences their expectations and the planning of their visit. Indeed having visited the same institution before – or similar ones – did influence the personal agenda of the family visitors at Eureka! From the above discussion, it also became clear that, the fact that a large number of the first-time visitors to Eureka! were provided with information about it, affected their expectations and the way they planned their visit. Thus, there seems to be a significant difference between the first-time visitors who had no information about Eureka! before their visit and those who were provided with information (and even images of the exhibits). There is a further difference between first-time and frequent visitors in that frequent visitors had first-hand experience of the exhibitions and knew exactly what to expect from their visit.

As noted in the case of the MSI, the differences between first-time family visitors, those who had been a couple of times and quite frequent family visitors were considerable. One

of the reasons which blunt these differences in the case of Eureka! is that it is a Museum for Children and children were in charge of the visit. This means that the majority of the adult family members, including frequent visitors, were quite happy to let children lead. It was a day devoted to children in a place designed for them and they enjoyed every minute of it. There were no fixed plans as there were so many choices for the children of things to do.

Another reason was that most of the family members who had not been before were provided with detailed descriptions of what is available in Eureka! In many cases (10 first-time family groups out of the 15), family members had multiple sources of information. This inevitably influenced their ideas and expectations of their visit experience. Yet, their agenda was not fixed as they wanted to see for themselves what was available and experience as much as possible.

6.4.2 The social context

The place of Eureka! on the family event itinerary, and the fact that the majority of the family groups (21 groups) specified that their visit was geared towards the children, reveal the significance of the social aspect of the family visit. As discussed above, only a small number of adult family members (in 5 groups) appeared to be concerned with their personal educational experience. This comes in contrast to the vast majority of adult family visitors at the MSI who were concerned with their own educational experience. Adult family members visiting Eureka! saw their visit as an enjoyable day out for the children and as a means of influencing their children's educational experience. Indeed, the education, entertainment and family event were the most significant itineraries on which Eureka! appeared. Catering for the family members' physical needs was another issue considered by the adult members of the family groups. They all mentioned having planned their lunch break before the visit since they would spent the whole day there. As seen in the case of the MSI, grandparents' expectations focused on the social aspect of the visit as compared to groups with parents who were mainly concerned with what their children could learn. However, the overall social agenda of the adult family visitors to Eureka! was much more child-centred.

On the other hand, the child family members were concerned more with fulfilling their personal expectations than with the experience the other family members would have. Of course, this does not mean that they did not enjoy going out as a group. As discussed above, the children in thirteen groups had been to Eureka! with a different group before and had persuaded the rest of their family to visit. A few of them (children in 6 groups) had discussed their experience with other child family members or friends and some (4 children) expressed the wish to share their next visit with them. Thus, some child family members at Eureka! expressed some concerns concerning the social aspect of the visit as compared to those at the MSI who did not express any similar concerns.

Children's social agenda Children in fourteen family groups wished to visit Eureka! with their family. In six of these groups a child member had been before. In the other eight groups, friends of the children who had been recommended it as a 'good' or 'fun' experience. In all of the above cases children shared the information they had and wanted to visit again with family and friends or to see it for themselves. It could be said that the only way for such young children to visit Eureka! would be with their family. However, there is some evidence that four of the children who had been before wanted to share their experience with members of their family. Thus, when they went home they discussed it with family members and persuaded them to visit together next time. Although this was communicated throughout the discussion with family members, only the most explicit extracts of the text are presented here for obvious reasons:

W: She has been with a party, with a friend but D. hasn't. So C. was telling D. about it and so D. wanted to come as well. (F2, Q1)

B: She said it was good.
W: She said it was good. Well, she said like there's a cash, cash dispenser thing and shops, that sort of things. (F4, Q1)

G1: Well, it's because, we came here because E. really wanted to come because she hasn't been before so we decided this morning that (...) 'you said you'll take us to Eureka!, didn't you?' (F6, Q2)

In the last example, this girl had described Eureka! to her friend in a lot of detail before she asked her grandfather to visit with her. This young girl along with another two children have connected the visits to Eureka! with the visits to their grandparents who happen to live in cities near Halifax.

One child referred to the effect the environment in Eureka! has upon his own and his mother's social behaviour. Having visited hands-off museums with his mother, he had been socialised to behave accordingly: not to touch the exhibits. Eureka! challenged this restriction: the child was allowed to touch the exhibits and, hence, the adult did not need to control his behaviour. This is an example of how different social settings affect peoples' behaviour (Falk and Dierking, 1992:63-66). Eureka! is an environment designed in response to a child's behaviour rather than one that demands a specific behaviour from them. A similar point is raised by Lewin (1989:62-63) who argues that children's museums are places designed to facilitate children's spontaneous behaviour in contrast with other public places.

Finally, a 3 year old child expressed his wish to share his experience in Eureka! with friends at the nursery school. He made a collage at the Recycling Centre which he wanted to give to his friend, as he had told his grandmother before the interview:

W: {...} see what he's made. He's taking it to the nursery tomorrow, to the children.
B: It's for K.
W: Oh, it's for K. It's his girlfriend. (F7, Q5)

Child family members wished to share a visit to Eureka! with other adult and child members of their family or with friends. Some of them were also aware of the effect that the environment in Eureka! has upon their social behaviour.

Adults' social agenda As mentioned above, adults in 21 family groups specified that the visit to Eureka! was geared towards the children. This number is considerably larger compared to the fifteen groups in the MSI. Furthermore, adults in 22 groups mentioned that they intended to influence the educational experience of the children in their groups. For the adult family members in the remaining six groups, concerns centred around seeing the children enjoying themselves. Four of them were groups consisting of grandparents.

Family groups consisting of grandparents (4 groups) described their visit as a social event. It was an opportunity to enjoy the company of their grandchildren, take them to places they would enjoy and spend some time together. One of them mentioned that spending time with her grandson was an occasion for tightening family bonds by visiting relatives and for doing things which she had enjoyed doing with her own children like visiting museums and different cultural venues. Thus, entertainment and the family aspect of the experience were the strongest elements of these family members' social agenda:

W2: I didn't expect to get very much for myself. Just to see her pleased. (F24, Q5)

W: For myself just the enjoyment of being with my grandson – and we enjoy being together a lot, don't we – just the enjoyment really. (F7, Q5)

Only one of the grandparents seemed to be preoccupied with her grandson's educational experience as well. She mentioned that she was a retired teacher and she enjoyed playing an active part in his learning development.

For five family groups, Eureka! was a place to visit with child relatives. In three of these cases, it was groups of grandparents bringing their grandchildren who stayed with them during half term or for the weekend. The other two families brought their children together with other children who were relatives of the family or the children's friends.

In three cases, adult family members mentioned that the visit was a surprise for their children who found out only when they arrived. Two family groups said that food was a special part of the visit. It was a treat for the whole family to be able to eat out.

In two other occasions, the family groups came to Eureka! to celebrate a child's birthday, suggesting that it was an experience enjoyed on a special day in the family's social life. In one of these groups, the visit to Eureka! was a way for the adult family member to regulate the child's behaviour:

W: She could come if she was a good girl. (F21, Q1).

Eureka! was also used by two non-conventional family groups as the place to meet and get together with each other. The visit therefore served as a family therapy session. There was one family group consisting of a step-father visiting with his step-son and another one where the adult was visiting his 5 year old daughter (from the second marriage) and his 17 year old grandson. Eureka! was perceived, by these families, to be an appropriate environment in which to spend time together.

As it was mentioned above, the adult family members of 22 groups expressed their intention to influence the educational experience of the children. All but one family group consisted of parents. There was only one group where the adult was a grandparent. The next section will present how these adults planned to use the exhibitions in Eureka! as an informal educational resource.

Enculturation Adults in 21 family groups seemed preoccupied with the children's educational experience. A lot of them had quite specific expectations. This referred to taking the children to specific exhibitions (such as Me and My Body or Hello! Is Anyone There?) and helping them to understand or letting them explore how things work by doing:

W: It's good for us. We can show him how things in the body work. You know, you press the button and you can see how it works. We're both nurses so he's very interested in how the body works because we've explained to him before. For example the exhibit on the digestion, when the food goes in the mouth, I mean, we could show him there, by pressing buttons for yes and no, exactly where the food went. (F13, Q5)

M: Yeah, we've found, it's actually easier to come here to explain scientific principles. It's more easy than to try to just sit down with a piece of paper and talk about it. (F26, Q1)

W: Just a family day out and maybe learn something, this one in particular {points at G1} because she's 7 and a half. This one in particular because she's learnt a lot more, you know, at school. You've learnt about the nose and the ears, haven't you? (F10, Q5)

The above cases are examples of a perfect match between the agenda of the adult family members and the agenda of the institution. In the last quote, learning in Eureka! is thought to assist school learning. The relation between formal and informal learning was also discussed by a couple. One of the adults believed that they support each other while the other one believed that they are different approaches:

W: In particular, with things that come up in school. They have something already that they can remember about rather than just pick out a text at the school and go to learn about 'circulate' and this and that. At least they've got something to remember about.
M: And it's a bit boring whereas here is a bit more interesting and a lot more visual. (F26, Q5)

Similar ideas were discussed by adult family members in the MSI who argued that museum learning is interesting and the memory of the experience is longlasting while school learning is boring and a lot more passive for the child.

The language adults used in the above examples is suggestive of their intention to provide their children with a rich learning environment which could meet their needs. On the other hand, the parents at Xperiment! seemed to be more involved in direct 'teaching'. They wanted to 'show' the children, to have the exhibition 'explain' to them or to enable them to 'explore' how things work. They found the exhibitions in Eureka! an excellent resource for the transfer of knowledge to the children. It contained exhibits relevant to the school curriculum and of interest to both the children and the adults. Moreover, the experience was multisensory and the children were motivated and enthusiastic about exploring things. Three adult family members specifically referred to the hands-on aspect of the exhibitions and their wish to expose their children to an environment where they can explore things. Another four adults mentioned that they wanted to enhance their children's science education. In two of these groups the adults had a science background and in the other two they mentioned that the children had expressed an interest in science which they wanted to develop further.

The hands-on approach of the exhibitions in Eureka! was seen by an adult family member as particularly appropriate for her younger daughter who had learning difficulties. She seemed particularly concerned with influencing her educational experience. She stayed with her daughter throughout the visit and tried to explain the exhibits to her while her other daughter went around Eureka! with a friend.

6.5 The exhibitions

As was seen in the previous case study, the agenda of family groups is influenced by the profile of the family visitors, socio-cultural patterns, the personal and social context of the family visit, their ideas about the subject of the exhibition and the communicative approach. This last section will examine how the exhibitions were perceived and reconstructed; the ideas family members had about the subjects covered by the exhibitions and about the hands-on approach to communicating these subjects; and how they all affected the family agenda.

6.5.1 Families in Eureka!

On entering Eureka! the family groups were faced with three choices: turn right, turn left or go upstairs. Nineteen family groups turned left towards Hello! Is Anyone There exhibition, five went upstairs to Me and My Body and only four turned right towards Living and Working Together. In fourteen of these groups it was the children who moved on first. In a couple of families the adults were observed to lead the way towards one of the exhibitions while the rest moved together. The vast majority of the family groups stayed together throughout the visit[31], although some family members separated for a while(figure A.12). The family members (both children and adults) in seven groups were observed viewing different exhibits quite often but always more or less in the same area. Only in three groups did the children wander around on their own. Two of these families consisted of grandparents who waited for their grandchildren to move on at their own pace. In both cases, the children went back to meet the adults regularly. The other family consisted of a woman with three children[32]. The older children left the woman and the younger child[33] to go to different galleries.

For the vast majority of the family groups, the family members stayed in the same exhibition area. Family members – especially in bigger families – went around in subgroups (9 families), usually dyads. These dyads could have three forms: adult-adult, adult-child, child-child. They often stayed together for a few minutes and were then replaced by others. Usually, younger children and families consisting of two members stayed together throughout their visit. In some cases (11 families), one of the adults adopted the role of the 'interpreter'. However, this type of behaviour was more evident in the Me and My Body or Hello! Is Anyone There exhibitions. Unlike the 'teaching' behaviour of the adults at Xperiment!, the adult' behaviour at Eureka! involved explaining or reading labels aloud; and demonstrating how the exhibit works or giving directions pointing at different parts of it. Hence, the adults at Eureka! seemed to rely more on the support provided by the Museum. However, in a couple of cases, this type of teaching behaviour led to aggressive behaviour[34] on the child's part. Yet, in the majority of the families (25 groups) information exchange brought family members closer together and there were signs of affective behaviour such as touching or embracing each other, holding hands, kissing, smiling at each other.

Where family members stayed together or met they interacted a lot. The following quotes are typical examples of family verbal interactions: (interaction between two child

[31] Appendix C contains categories of observed behaviour used in the analysis of this section.

[32] Two of which were her daughters (7 and 10 years old) and a 10 year old friend of the older daughter.

[33] During the interview, it was revealed that she had learning difficulties and her mother wanted to help her with the exhibits. This often resulted in aggressive behaviour from both sides as the mother pressed her daughter to pay attention and do things which the child did not always want to do.

[34] Aggressive behaviour was also associated with competition between child family members over who would use an exhibit first (in 7 groups).

family members) 'fill in this form {in the Bank}. How much do you want?', 'we can spend {money taken in the bank} it in the Marks & Spencer'; (interaction between adult-child family members) 'see daddy, do you see?', 'press that, press that button', 'can you see inside?', 'come on to measure your weight. You stand up there'; (adult explaining an exhibit feature) 'that's the noise you make when you jump on the footprints'; (an adult explaining a Eureka! feature) 'see "lost child", that's where you go when you're lost'; (sharing an experience) 'V., feel this. It's freezing cold!'; (encouraging a child to express herself) would you like to draw a picture?'; (regulating behaviour) 'you have to wait. Somebody else is using it'; (starting from a child's previous experience) 'do you know when you're hungry and your tummy rumbles [...]'; (challenging tasks) 'will you be able to read my message?'; (providing a child a way of learning) 'so you read the question and think of what the answer might be' .

There were cases where older children (in 6 family groups) and adult family members (in 3 family groups) followed their own pace and went in different directions or where adults (6 groups) observed the rest of the group interacting with exhibits without always taking part. This type of behaviour was observed with families with older children who did not need help and with quite young children who moved on very quickly from one exhibit to the next.

Social interaction outside the family groups did take place but it was limited. Twenty-four family groups were observed looking at other visitors interacting with the exhibits. This happened either while they waited for their turn at an exhibit or as they wandered around. This type of behaviour was more likely to happen when the exhibitions were quite busy. In eleven of these family groups, their members spoke to other visitors[35]. Sixteen of the 28 family groups observed came in contact with the enablers. In twelve of these groups, the family members either listened or watched a demonstration by an enabler. This happened at the Bank, the Shop and the Factory where there usually were enablers who took the role of bank and shop clerks or factory workers, and at the desk top publishing and TV studio. Only nine of the above family groups, interacted verbally with an enabler. Usually this interaction was initiated by the enabler except for a couple of cases where a family member spoke or asked for help.

In a few cases, visiting the exhibitions was physically tiring for some adults. The visit had to be interrupted in nine cases as family members had to take care of each other's physical needs. This included going to the toilet and having something to eat. A few families took pictures or filmed other members in their family while interacting with exhibits.

[35]One of them was a 10 year old boy who visited with his grandmother who did not take part at all. The boy interacted a lot with other visitors at the communication tower which can only work with pairs of visitors.

Time spent in the exhibitions Family groups were observed in two of the three main exhibitions in Eureka![36] The time they stayed in them was recorded. Three family groups were followed in one exhibition only as they either had very young children or the children were afraid of the exhibits[37]. The average time spent in two of the three exhibition was 75 minutes with a maximum of 3 hours and 40 minutes and a minimum of 25 minutes (table 6.9).

minutes	number of family groups
<30	1
30-60	9
61-90	12
91-120	3
>121	3

Table 6.9

Time spent in two of the exhibitions.

Thus, the majority of the families spent quite a lot of time in two of the main exhibitions (between 30 and 90 minutes for both exhibitions). This is quite a lot considering the age range of the child family members.

6.5.2 How were the exhibitions perceived?

There was a distinct difference in the type of exhibitions the child and the adult family members preferred, remembered or talked about and in the way they commented about these exhibitions. This came mainly in response to the questions 'Which exhibits did you use' and 'What did you like (or remember) the best'. During this part of the interview, family groups were shown pictures of exhibits from all three main exhibitions to refresh their memory and stimulate discussion.

The child family visitors at Eureka! found the Living and Working Together exhibition particularly appealing. The second favourite exhibition was Me and My Body followed by Hello! Is Anyone There. A couple of children mentioned the Recycle Centre and only one the Jungle.[38] On the other hand, the favourite exhibitions for adult family visitors was Me and My Body followed by Hello! Is Anyone There. The exhibition mentioned least was

[36]The first two they chose to visit.

[37]The observer decided to stop the observation and ask them to be interviewed since it seemed very likely that the groups were about to leave Eureka! They were among the family groups who spent the shortest period in the exhibitions.

[38]Thirty-seven out of the 43 children specified which exhibitions they preferred or remembered: sixteen of them mentioned the Living and Working Together exhibition first, twelve referred to Me and My Body, eleven to Hello! Is Anyone There, two to the Recycle Centre and one to the Jungle which is the only area for children under the age of 5.

Living and Working Together[39]. There was no difference between first-time and frequent family visitors or between family members within the same age groups or between family members of different sex as to which exhibits they referred to.

Child family members seemed to prefer the exhibitions – and those exhibits within exhibitions – which involved them in role-play rather than the press-button ones. The vast majority of the exhibits in Living and Working Together and most of the exhibits in Hello! Is Anyone There allow children to assume a role and get involved in collaborative play with members of their family or other visitors. These are also the exhibitions where visitors are more likely to come in contact and interact with the enablers. Furthermore, the exhibits which were favoured by children in Me and My Body exhibitions were not among the hi-tec, push-button ones. They were exhibits which involved all senses, focused on a process, contained personalised information or required some degree of physical activity from the visitor. Pictures of some exhibits are included in appendix A (page 250).

Apart from the opportunity to play, for the child family members in two of the groups, role-play was seen as a way to see the rest of the exhibitions. They particularly referred to Living and Working Together and how the different environments linked to each other. For example, you should withdraw money from the Bank in order to pay for your food in the Shop and for other services. You could also become a postman and deliver letters to different locations. Although exploration is still a main focus of the activity there also appear to be some rules and goals which, according to Gardner (1973), are usually associated with adults' formal play activities. Hence, play in Eureka! becomes a relatively disciplined operation. The following extract is a particularly explicit example:

{I: what do you think the Post Office tries to show you?}
B: You go to all those places//
W: //Delivering letters.
B: Yes. You get to see everything.
W: Yes, because he takes the letters to the Bank and then he takes them to Marks & Spenser and they took them all. (F27, Q9)

In contrast to the children, adult family members seemed to favour those exhibitions or exhibits which required mental activity more than physical ones. Hence, the most appealing exhibition to the adults was Me and My Body. This is the most didactic exhibition as compared to the other ones. It is also directly related to the National Curriculum and to measurable learning outcomes. It therefore expresses the adults' (parents' in particular) social agenda for the visit. Hello! Is Anyone There was the second favourite exhibition

[39]Thirty-five out of the 42 adult visitors specified which exhibition they preferred or remembered the most: fifteen mentioned My and My Body first, ten referred to Hello! is Anyone There, six to Living and working together, one to the Recycle Centre and another one to the Jungle. The other seven adult family members either mentioned that they liked everything or talked about what the children in their groups preferred.

among adult family members followed by Living and Working Together with only six adults having mentioned it. Five of the adult family members who expressed their preference for exhibits in the latter two exhibitions mentioned that they were impressed by the technology involved. In total, fourteen adult family members referred to the exhibits in terms of what the children in their groups could learn from them.

6.5.3 Social interaction

Seeing pictures of the exhibits the family groups had visited brought back memories and stimulated verbal exchange between family members. Unlike family groups at Xperiment!, only a couple of family groups in Eureka! exchanged ideas and information about exhibits during the interview. This was limited to identifying the exhibits and stating which ones they used, liked or disliked. The latter types of behaviour is consistent throughout the interviews.

There was only one group where the adult family member tried to 'teach' or remind the child of what they did and, hence, reinforce the learning experience. The adult family member in the first quote below used similar 'teaching' techniques to those used by adults at the MSI. He asked questions and provided positive verbal rewards for correct answers. He also gave the child clues as to what the right answer might be. This type of behaviour is again related to the age of the child who is a 6 year old boy:

M: Do you remember these? What were these near at the side of the boat?
B: {points at the navigations instruments on the picture} Yeah, that one.
M: What do you think that did?
B: It showed what part of the boat was beginning to (...) or something.
M: {laughter} What other dials they have on here did, do you remember?
B: They had like a scope.
M: That's right. That was the speed, wasn't it?
B: Yeah, 'oh, I'm going too fast. Slow down, slow down!'
M: It was very good. We had a good go on that. I liked that very much. (F11, Q9)

The vast majority of the family groups confined themselves to identifying the exhibits they used and, occasionally, adding some comments about them. The following is typical of this point:

M: You've used that before. That's the one where you make an electrical circuit at the bottom of that.
G: I can't do it. I've been in that {points at the picture of the yacht}.
M: You've been in the boat. We made the rocket go off. We played the interactive video game at the boat.

G: I remember that one from last time {the kitchen in the House}. We've used that one {refers to the communication tower}.
M: Yeah. (F17, Q7-8)

There were just seven adult family members (in 5 groups) whose background or occupation was related to science or technology. On the contrary, adult family visitors (in 20 groups) at the MSI either had a science background or stated to having had a special interest in science and technology. In the case of Eureka! adult family members in only two groups expressed an interest in science and technology. This together with the fact that the vast majority of the adults relied on the support provided by Eureka! to help visitors understand the exhibits, could be the reasons why in this case study the adults did not try to directly teach the children.

6.5.4 How were the exhibitions read?

The exhibition space in Eureka! is divided into three main Galleries which are arranged thematically[40]: Me and My Body; Hello! Is Anyone There; Living and Working Together.

The titles, themes and subthemes (where appropriate) of the exhibitions are clearly marked (pictures on page 259). The way in which each gallery is organised is in terms of sections of the gallery within larger areas. This organisation is signalled on the panels of the sections through a label at the top. Another panel presents an overview of each section by asking a series of questions related to the subject. Furthermore, each exhibit has a title clearly marked on its top and labels which provide information on how to operate it and a description of what is observed. The exhibits and the support material in Eureka! are aimed at the children's level of understanding[41] and all new words are explained. Information is kept to the minimum possible as one of the intentions of the exhibition team was that the exhibits would be self-explanatory. There is a uniform way the information is presented starting with a question at the top of the label followed by more information about an idea or concept. Unknown or difficult words are highlighted by using a different colour. Thus, the messages are quite clear and are repeated or reinforced regularly throughout the exhibition. Within the exhibitions there is not a single narrative. Instead visitors can choose which exhibits they want to use and there are a number of junctions where they can decide which route to follow.

Hence, it can be said that the exhibitions are designed so that it would be fairly easy for visitors to follow the concepts and ideas presented and to be able to orient themselves physically and intellectually through them. As a result the vast majority of the family

[40] As it was discussed in section 6.5.2, the vast majority of the child family members (44 out of 47), and of adult family members (43 out of 45) who referred to specific exhibitions or exhibits mentioned these ones. Only three child and two adult family members referred to the Recycle Centre and the Jungle in very general terms. These exhibitions are not included in the following discussion.

[41] Front end evaluation and research informed the development of the exhibitions; see also section 3.4.2.

members – both adults and children – were able to relate the exhibits to the section to which they belonged or to the general theme of the exhibition. In some cases the readings family groups made overlapped with some of the messages the exhibition team intended to communicate. Furthermore, the majority of the accounts of the visit did reveal a structured reading[42].

Some of the adult family members' (in 11 groups) accounts of their visit addressed their social agenda. Thus, when they were asked 'What do you think this exhibit/exhibition is about or tries to show you', a lot of them responded in terms of what the children could learn[43]. On the other hand, children seemed to address their personal agenda by describing what they had experienced and what it meant for them.

Reconstruction of the visit There were two alternative reconstructions of the visit to Eureka!: every day things and how they work, and learning about one's self and others. The first reading relates not only to the content and objects on display but to the communication approach of the exhibitions. This was also seen in the previous case study where one of the readings involved visitors' accounts of their own observations during the visit. Here again, this type of reconstruction is quite general as it does not involve any explanation of the phenomena or ideas involved.

These alternative readings were expressed in different ways by each generational group. In some cases, adult family members reconstructed their visit by relating it to personal information which linked to the previous experience of the family members.

(a) 'Everyday things and how they work'

One of the readings involved linking all of the 'everyday things' in two of the galleries. These were the Hello! Is Anyone There and Living and Working Together exhibitions on the ground floor (figure A.12). Family members in fifteen groups (13 children and 9 adults) tended to read these exhibitions as being about things that people use at work or at home, and how they work. There were some variations of the same reading. One of them referred to the progress of modern technology:

B1: The videophones because it's like you talk from a distance but you can see them, the others, on the camera.
{I: What do you think it tries to show you?}
B: Oh, the way that the communications have moved on and got better and better, and how you can see who you're talking to. (F12, Q9)

[42] As seen in section 6.5.2, the children tended to account for the parts of the visit which involved role-play or, in some cases co-operative play (this was manifested during the family interviews). The adults, however, accounted for the more didactic exhibits which presented 'facts' or could potentially influence the way the children in their groups think.

[43] This of course could be an indirect way for them to say that they knew or could understand the ideas and concepts presented by the exhibitions which were mainly for children.

M: {making newspaper} It was the speed, how quickly the newspaper was put together. I think it's the speed. You go and take the photograph, the first thing, and put it in front of the camera and put the camera of the picture from the actual picture into the newspaper in a matter of minutes, very quick. (F11, Q9)

Another one focused on having a first-hand experience with things which they often do not have the opportunity to use:

B: My favourite one was the Garage, because you can become a real mechanic. I filled petrol into a car, ehm, got into a car and used some tools and changed a wheel. (F29, Q9)

W: I think it tried to show the children (...) it's a hands-on to exactly what a postman does and he does get a parcel and there's an address on it and you can take it to where this parcel should go. (F12, Q9)

The fact that most of the exhibits were real objects displayed in context added to the whole experience and made it worthwhile. In some cases, they were objects that family members had seen elsewhere or had heard about but never had seen or touched them for themselves:

W: {submarine cable} I've heard about that but I didn't really know how it works, you know. It's good that they try a bit and explain, you know, about the dots and dashes, what they meant. That was good. And you learnt how to do it, didn't you?
G: Hmm!
W: I was telling you what to write down and you were writing it down, weren't you? (F10, Q9)

W: Yeah. I mean you see them {refers to the videophone} on television but I've never seen one for real. You only see them on television. Because I've wondered what they were like when I saw them on television. (F5, Q9)

It also seemed to help children relate the exhibits to real life situations and their experiences. A good example is the drawing made by a 4 year old boy (figure 6.1). He tried to draw the boat exhibited in Hello! Is Anyone There as it would look in the sea. The circle-like shape is the boat while the zig-zag lines under it represents the sea.

The combination of real everyday life objects and the role-play seemed to have a very strong effect on the children who really believed in the roles they assumed:

B: I phoned to the mechanics to come and pick me up, 'my car's broken down'. {refers to the car in Hello! Is Anyone There exhibition) (F27, Q9)

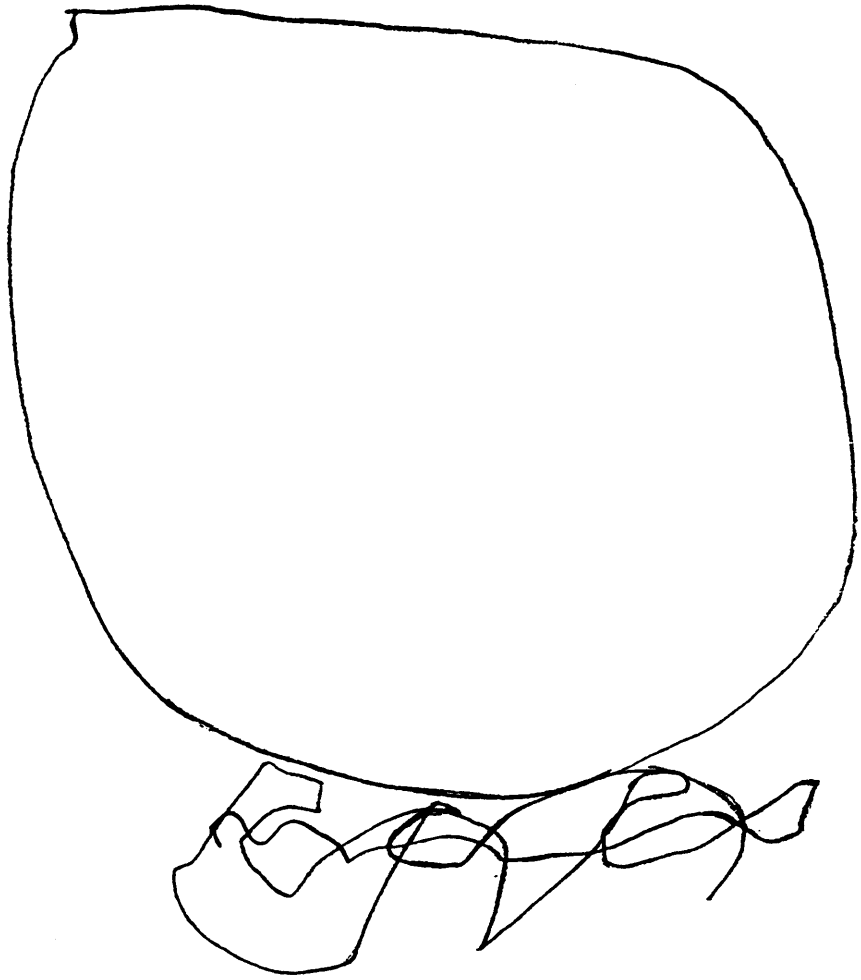


Figure 6.1. *Drawing of the Yacht (boy, age 4).*

W: Oh, I liked the Post Office and all the parcels. I think they're lovely and to see the children; they're all in their uniforms and they're delivering the parcels. It would take them an hour to collect all the parcels at the end of the day when the place is shut and put them all back in the Post Office. Because he said 'where this one go?' and I said 'oh, that one should be delivered to the Factory'. So he took it to the Factory and I said 'aren't you going to bring it back again?', and he said 'no, I've delivered it to the Factory'. He wasn't going to bring it back again because it should be in the Factory, you know. I really enjoyed that. I think it was lovely. (F12, Q9)

For one child family member, getting involved in the role-play activities on the yacht was very useful. He was going to the National Sailors' Centre and, hence, he had the opportunity to try some of the things he would be learning a couple of weeks later. His drawing (figure 6.2) was on the same subject. He draw himself wearing a life jacket and

sailing the boat. The circular figure in the middle is the sail as seen when the wind blows it. The drawing is based on his previous experience (the wind blowing the sail) and also on things he did on the boat on the day of the visit: he wore a life jacket and pretended to sail the boat. Another interesting point is the size of the boat and its sail compared to the boy's figure. This should have made a strong impression on this young boy.

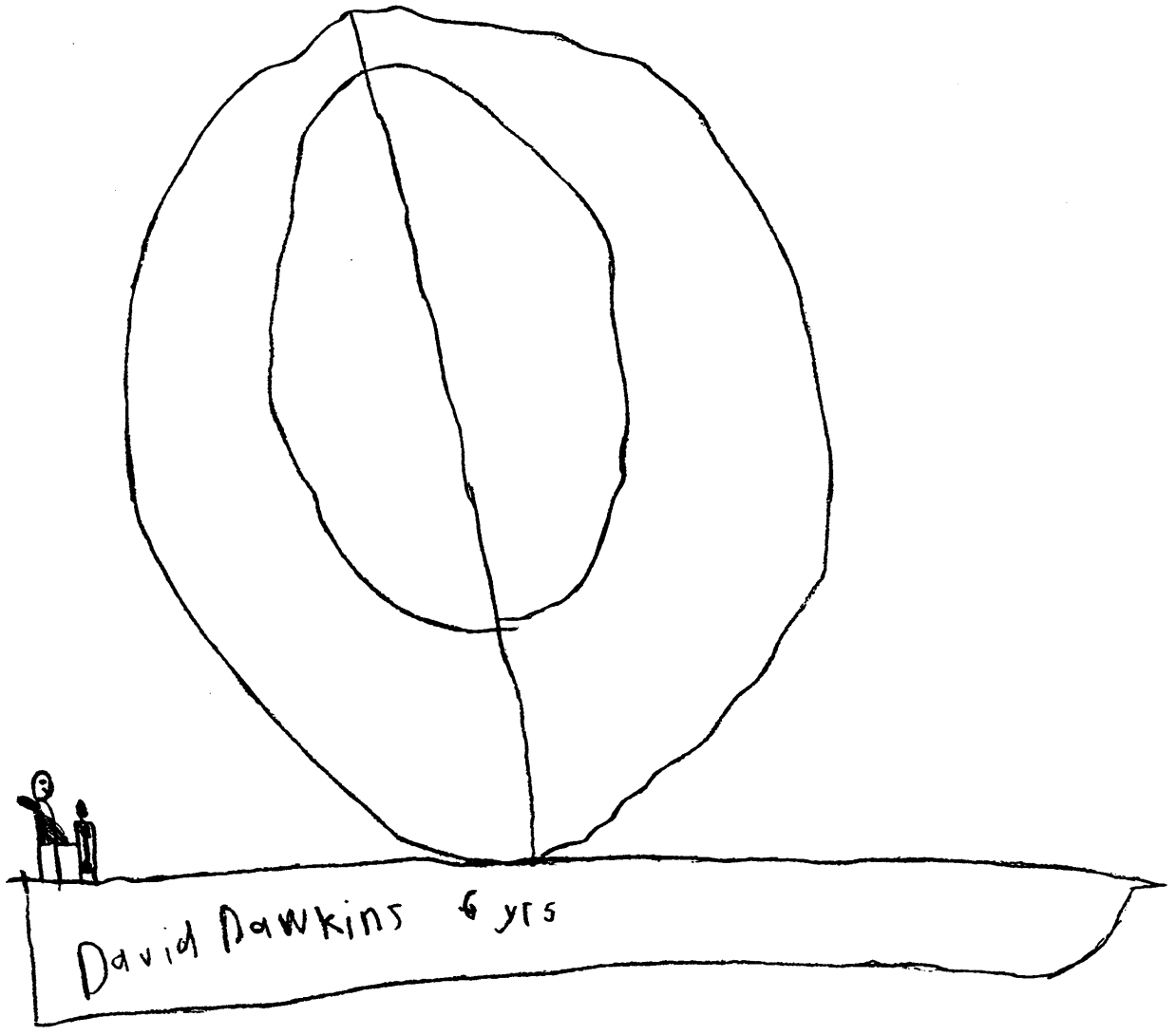


Figure 6.2. *Drawing of the yacht (boy, age 6).*

(b) 'Learning about one's self and others'

The second reading was to do with learning about one's self and about others and referred to the Me and My Body exhibition. Family members in thirteen groups (14 adults and 9 children) tended to reconstruct the exhibition in terms of 'how your body – or parts of your body – works'. They tended to link particular exhibits to the subject they presented or to the theme of the whole gallery. Again more than half of the adult family members responded in terms of how they thought it affected the experience or way

of thinking of the children in their groups. Some adult family members linked the exhibits to the theme of the gallery whilst others referred to specific exhibits and how they read them. On the other hand, all child family members referred to particular exhibits. The following quotes are typical examples of this point:

W: I think the Body {refers to Me and My Body} is quite good 'cause it shows everything about the body and how it works and what things do in the body and things like that. I think that's interesting. (F1, Q9)

{I: what do you think feed me is about or tries to show you?}
B: Where the food went, how things work once the food comes through your mouth. (F13, Q9)

{I: what do you think feed me tries to show you?}
G1: What happens when you eat things.
G2: Different stages of eating. (F26, Q9)

Apart from learning how one's body works, a few family members referred to the fact that one can learn about one's own feelings or development and also learn to appreciate other people's feelings and empathise with them:

W: I liked the one encouraging children to talk about their feelings because they don't very often. I thought that one was very interesting. (F23, Q9)

G2: {refers to what if you couldn't exhibit} You can wear them and feel what is like, how difficult it is.
G1: You can learn what it's like for people who can't walk and can't see. (F3, Q9)

W: It's very good for him just to realise how babies grow in there. (F22, Q9)

A 5 year old boy was impressed by the image of a pregnant woman and the video showing an unborn baby in his mother's womb. He tried to draw an x-ray picture of the woman and the baby starting by drawing the womb (figure 6.3). When this attempt failed[44], he started again by drawing the mother's head. By that time, the family had to leave and the drawing remained unfinished.

The above section explored the alternative ways in which family groups approached the exhibitions and reacted to them. The next section refers to the presence of their social agenda during the process of the reconstruction of the visit and emotional reactions to particular exhibits.

[44]He realised that there was little space to draw the mother's head so he tried again. The circle he first drew to represent the womb is still visible.

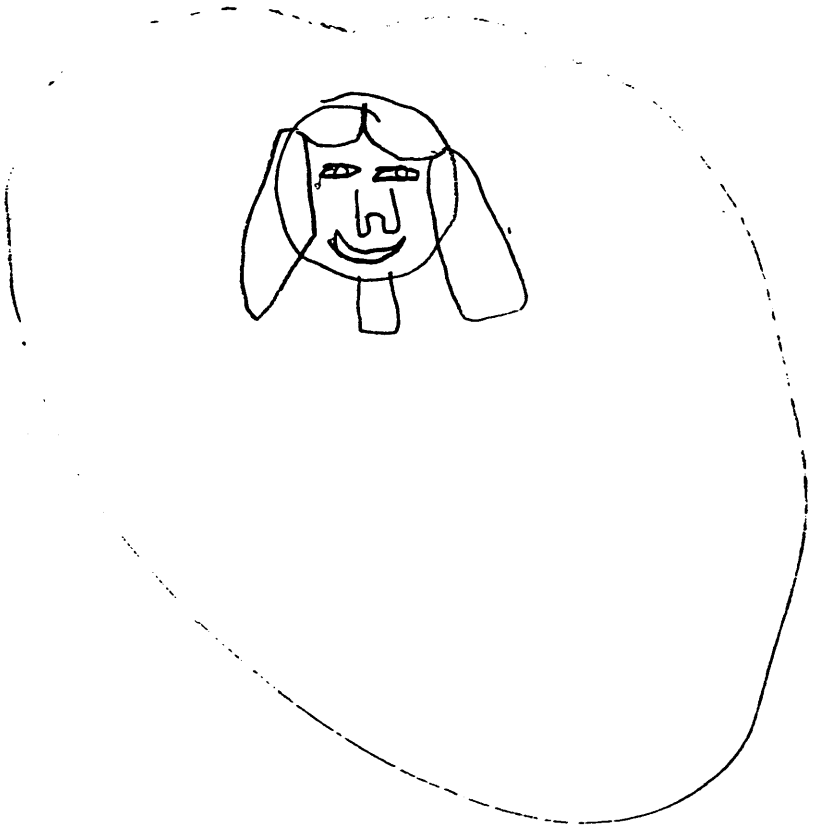


Figure 6.3. *Drawing of the hello baby (boy, age 5).*

Reconstructing the social agenda Personalising the information was quite important for more than one-third of the family groups. Family members referred back to previous experiences which the exhibits prompted memories of; linked the information with their work or lessons at school; with things they were planning to do (figure 6.2); or things that they had seen elsewhere before. They incorporated this information in their accounts of the visit:

> W: {feel the sound} Well, we all kind of have ear infection and so when I experience like being imbalanced, when something is wrong with the ear, and so there you can see what's going on inside it and everything. (F3, Q9)

> W: {hello baby} The one I remember, I quite liked this, the scan. It was easier actually (...) {addresses her husband} Remember having the scan when I was expecting her and not being able to figure out where anything was? The doctor was saying 'there's the head'. You could actually see it on that one which is much better. Well, the baby is actually there, it's not something that appears of nowhere. You can actually see

the baby that's inside and feel it move around. (F16, Q9)

W: I thought that one was good {points at hello baby}. I'm a midwife actually so I thought that was good and my sister is expecting a baby and she's done a scan so (...) because usually with modern equipment (...) when you put your hand on the tummy the baby doesn't move when you want to so that was quite good. It shows what's going on inside. It does move so I thought that was good. (F22, Q9)

What is striking about the last two extracts is that both members of the families referred to the same experience in exactly the same way.

As mentioned above, there were a further fourteen family members (all parents) who seemed to be quite concerned with influencing their children's educational experience. This attitude is quite consistent with the expectations of the majority of adult family members who visited Eureka! for the children. One of them commented on the fact that Eureka! fosters social learning between family members:

W: I expected it to be educational for the children and it's been educational for me as well. I didn't expect to come and learn anything. I expected to come and they learn but I've learned as well from them. (F12, Q5)

Children's experience was also important for the grandparents in four of the family groups. In their case, however, children's enjoyment was very much on their social agenda. Thus, the grandparents in Eureka! focused on reciting their grandchildren's experience during the visit while they stated that they liked everything they saw.

When families were specifically asked to try to relate things in Eureka! to their previous experience, the majority of the family members were able to do so. Family members in sixteen groups referred to things that they use at home, at work or at school which were similar to many of the exhibits, especially in the two exhibitions on the ground floor[45]. The adult family members of one of these groups hoped that visits to Eureka! and to other museums would help the children to make links between things they learn at school and things they saw in these environments. An 11 year old girl referred to a specific exhibit in Me and My Body which explored different types of feelings and said that she had seen people being angry before and the body language associated with anger.

A few family members (in 4 groups) made connections with similar exhibitions that they had seen elsewhere such as in science museums or science centres, in visitor parks but also in children's hospitals and at a road show organised by a local health authority on health matters.

Affective experience A number of family members (in 6 groups) mentioned that they responded emotionally to some of the exhibits they saw in Eureka! This usually involved

[45]They recalled having seen boats at marinas or having seen things like videophones on the television.

exhibits which made noise or had a 'surprise effect'. This is how the exhibits affected their behaviour and the way they perceived them:

> B: I wanted to see Archimedes because it, five minutes before it started to drop so we just waited there but I got a sudden surprise because after it had dropped in I went just under the water bowl and I started looking at the books and suddenly it draws up the water. So suddenly it flashed all over me {laughter}. (F23, Q9)

> W: She liked the one with the, where you used the pedals and you got the skeleton next to you. We were surprised the first time she did it. I wasn't quite expecting to see that {laughter}. It gave me quite a turn {laughter}. (F16, Q7-8)

In one of these cases, the effect was quite negative as a 2 year old girl was too frightened to see a lot of them. It seemed that a lot of the exhibits – particularly in Me and My Body – were quite novel and strange to her and the whole experience was overwhelming:

> W1: Yes. The mirrors, she was scared of the mirrors and she was scared of the robot upstairs. She didn't want to see that. She didn't see that {points at the hello baby}, she was scared of that {...} She was scared of anything on the top floor except for the big mouth. (F25, Q7-8)

Another two family members referred to the way a couple of exhibits were presented and designed. That was what attracted them to the exhibits and the reason why they found them interesting.

The process of reconstructing the exhibitions revealed that family visitors come to Eureka! with certain ways of reading them which relate to cultural patterns but also to their personal and social agenda. Presenting them here separately was a means of making them known and understanding them better. The next two sections will present families' ideas about the subject of the exhibitions and the communication approach in relation to their agenda.

6.5.5 Ideas about science and technology

As was discussed above, family groups were specifically asked to relate ideas or concepts presented in the exhibits to everyday life. Most of them could very easily do so. They were also asked whether their visit(s) to Eureka! helped them change the way they saw science and technology. Responses to both questions revealed the respondents' notions about science and technology and about their attitudes to learning in relation to those subjects. The issues which seemed to arise from the discussion was how family members used Eureka! to achieve scientific and technological literacy; and how such an informal interactive learning environment affected the way they perceived learning as a process and themselves as learners.

By using everyday things or things that are directly relevant to people's lives as a starting point, the exhibitions in Eureka! came across as accessible to visitors from different backgrounds and of different age groups. Most of the family members related the exhibitions to everyday things which were familiar to them. Some referred back to similar informal learning experiences they had in other museums or institutions. Thus, the theme of the exhibitions was already close to some visitors' interests.

Another element which made the ideas and concepts presented more interesting was the 'doing' element of the exhibitions and the way the exhibits were interpreted through the panels and put into context. Family members felt that they could learn how everyday objects work. This made science and technology more accessible in their everyday life as well. Thus, starting from familiar everyday objects, Eureka! introduced family visitors to more abstract ideas and concepts by making links with more familiar ideas and information (figure 6.4).

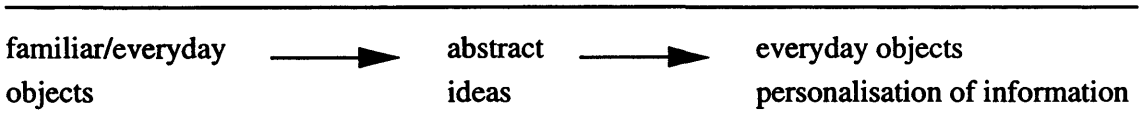


Figure 6.4. *Introducing abstract concepts.*

The following quotes illustrate the above point:

B: Yes because I know how computers and how phones work and how people send money to different places and how security alarms work. (F27, Q13)

G: Yeah, you can learn more about them.
W: It's in context, isn't it? So you can follow through a line here about the telephone and actually follow through from talking into it to see (...) you have an idea of what happens, haven't you?
G: Yeah. (F11, Q13)

W: Yes, I think so. I mean, when I was at school we didn't have anything like this about science and technology, you know, and actually being able to do something it makes you realise, I mean, things like how the car works or how the TV works. We actually use these things all the time but we don't know, well, I don't know how they actually work. (F15, Q13)

M: You see, another good thing about a lot of the exhibits is actually to try to explain the principles underneath. Some from the place you can go to, you can see the demonstration and it's sort of very interesting visually. But there's very little on the scientific principles underlying it all or the reasons why it does it, it does this or it does that. Or some times they explain it but not very well at all. I think here each

one of them tries to get across the principles. It's only putting across a very simple point. (F26, Q9)

Commenting on the approach Eureka! has adopted in communicating science and technology to the public and how successfully he thinks they are doing it, the above adult family member and his partner added later on during the interview:

M: I think there's a huge scope for communicating science and technology which can make a pretty baffling area. There's a lot of things//
W: //And the adults enjoy all these things.
M: Oh, yeah just see how other people have approached the way of getting you the different taste buds {refers to taste here exhibit in Me and My Body}.
W: Oh, yes. It's a very boring diagram with sort of the different areas marked out. It's nicer to see, press a button and see it all light up. You know, it's much more interesting and you can feel things that you can't get out of books. (F26, Q11)

In total, 21 family groups mentioned that visiting Eureka! affected their attitude to science and technology (at least to the extent these affect their lives), to learning and to themselves as learners. The other seven families said that members in their groups were interested in science and technology ('how things work') before they visited Eureka! That was the reason they decided to visit. Thus, like the adult family members who visited Xperiment!, adult family visitors used the exhibitions at Eureka! as a resource for socialising children's thinking and, to a lesser extent, for self-directed learning for themselves. Getting involved in the activities and being able to make the exhibits work (problem-solving), helped family visitors understand the exhibits and learn new things:

W: Yeah. That's the main thing. You get your brain going I think, you know, because you have to figure out how you do this and that and you have to look at it and read it. (F10, Q13)

B: Yeah. You learn new things 'oh, alright, I never knew that' and you want to know more about it. You think 'it's interesting'.
W: 'Cause you understand it, don't you?
B: Yeah. (F20, Q13)

Being interested in 'how things work' and being able to explore and touch things, is often related to the idea of becoming motivated to find out more about them. Some families mentioned that visiting Eureka! influenced their attitude towards learning and made them aware of different ways of learning. The following quotes are typical examples of this point:

G1: You can, you can learn how more exciting it is in here so you think, you get interested more. So when you go home you feel like learning a bit more about it.
G2: Yeah, you learn that it's more fun. (F3, Q13)

G: Yeah, because I know more things about it because each time you learn something else and it's never ending really. (F15, Q13)

W: You've always been interested in that, in how things work, haven't you, the pair of you? I think this is to show them how things work, make them more aware of some things.
B1: They're great! I've always liked to know how things work. (F12, Q13)

Thus, finding things which are interesting develops visitors' – especially children's – curiosity and motivates them to explore more using various resources. This can develop a disposition to learning and give visitors' the tools to learn how to learn.

6.5.6 Ideas about hands-on museums

Family members perceived Eureka! as being physically and intellectually accessible. As in the case of Xperiment!, family members referred to Eureka! and hands-on institutions in general as being places where learning becomes 'easier' and 'fun'. Again they did not question the content of the exhibitions and whether it is worth learning about. Neither did they discuss accessibility in terms of gender or cultural and social background. However, age was occasionally mentioned.

The picture that family visitors at Eureka! seemed to have about hands-on museums appeared to be more complicated and to have more parameters than the one family visitors at Xperiment! had. This could link to the reasons why family groups visited these institutions. As discussed in the section on cultural itineraries, family groups seemed to visit Eureka! and the MSI for different reasons. The image of Eureka!, as a Children's Museum, also seemed to influence the personal and the social context of the visit with children being in charge of it and expressing their views throughout the interview.

The vast majority of the family members at Eureka! appreciated the fact that science and technology was made accessible and relevant to them and to their families. They particularly referred to the communicative approach – the 'doing' dimension – of the exhibitions and the way people can relate to them. Having had a strong social agenda for the visit, adult family members in sixteen groups welcomed the idea of having a place which takes into account children's developmental needs and abilities. They referred to the children's need to be able to play and touch in order to be interested. 'Being interested', was the phrase most often used to describe the type of experience at Eureka! while 'having fun' was used less often:

W: It's more like playing really rather than go down to the museum or an exhibition. It's actually, it's much more interesting and you get a lot more out of it when you actually try it yourself. (F26, Q3)

W: I think it's much better when you can touch and participate in everything. {...} I think it is probably the best {place} that we've been to and it's the only place that everything is aimed at children really. They've got things that interest them because most of the museums children have no interest in. (F13, Q14)

Family members in two of the above groups mentioned that this is the approach to learning that they preferred. Adults in another four family groups explained that it is quite appealing for people of all ages to be able to touch and get involved. There was also a group of four families who mentioned that they really appreciated it when they found things for children to do in museums.

Family members used different expressions to describe their experience with the exhibits. There were differences between the ones used by adults and the ones children used. Apart from 'being able to touch', the most common expressions the adult family members used were: 'getting involved', 'taking part', 'experimenting' and 'making things happen'. The ones child family members used were: 'to do' and 'to work out'. These particular phrases reveal that the visitors saw themselves as playing an active role during the visit.

The adults in eleven groups believed that, having the opportunity to touch things, assists learning especially children's learning. They often said that 'it is easier for children to learn' because everything in Eureka! is geared towards them and they are interested in it. Moreover, the children were given choices of things they wanted to do and learn about and could see the result of their actions. The following extracts are typical examples of this point:

W2: Ehm, I think it's a bit easier for children to learn here and I think that the museums tend to be like, like adult, you know. So they don't try to make it easier for children to go round. It's far better this one. (F25, Q14)

W: Yeah, I think it's wonderful. I think, you know, they learn much more. They actually do things and see what happens when they turn a wheel and things like that. (F29, Q14)

W: Yeah, I think it's, the more kind of experiential things children have, the better they learn. (F3, Q13)

The adult family members in one family referred to learning as a process and to museums as places which give different perspectives of things and can influence children's thinking if used regularly. Two family members also mentioned that, although they think

of the visit to Eureka! in terms of learning, they believed that the children in their group think of it in terms of enjoyment only.

Some concern was expressed (by 5 adult family members) about the way the children used the exhibits and the way the environment of Eureka! affected their behaviour. They said that the children tended to press buttons and run from one exhibit to the next without concentrating. In some cases (5 groups), this resulted in an uncertainty regarding the suitable age range of children visiting Eureka! Most adults were concerned that the children (between the ages of 3 and 7) they were accompanying were too young for Eureka! Only two adults mentioned that the children might have been too old for it (children of the ages of 10 and 12). In total, eight adult family members expressed a concern about the suitability of Eureka! for their children:

> W: Well, I think this, this is a good Museum but I think they do sometimes tend to go around pressing, you know, just pressing everything. Perhaps it would be better to concentrate on one thing.
> B: Or have guided tours.
> W: Or have a guided tour, yes, or perhaps school children. They might be able to get more out of that on a field trip. (F15, Q14)

> W: I think it's good for the children if you can get them to concentrate long enough on what they do. I think there was so much going on around them that they can't concentrate on one thing in particular. They might have if they had been a bit older.
> M: These ones run from one thing to the next, don't they?
> W: Yeah. We could have spent a lot of time explaining things to them what was happening, especially in the body but they were just jumping from one object to the next. (F2, Q5)

> W: But a lot of these things are too old for him, you know, at his age {3 years old}. He doesn't understand it but he will as he grows older. (F7, Q7-8)

One adult thought that it is quite difficult to evaluate if children 'absorb anything in terms of learning' whatever their age is. There were, thus, a few family members who thought that there was a certain age range of children for which Eureka! was appropriate. In the case of four family groups, the children were from the age range of 6 to 12 which is the target audience of Eureka![46].

On the other hand, the child family members (19 children in 16 family groups) focused on the kinaesthetic aspect of the experience and on the removal of any physical or behavioural restriction. The latter seemed to give them a sense of freedom of choice which

[46]There is a discrepancy in the bibliography concerning their target audience. That means that there may be more cases of family groups who were unclear whether Eureka! was suitable for the children in their groups.

they did not usually have in museums. They had control over the activities they wanted to do and the senses they preferred to use, their behaviour was not restricted by adults and they could do the things only adults are normally allowed to do in real life. They could play and learn at the same time and they could see that learning could be fun:

> G2: Eureka! is like, it's really good. It's like a playground. You can play as well as learn things. It's not like other museums where you can't touch things and play with things. (F3, Q14)

> B1: I think this is better because you can do something and not just go around and read things. You're actually touching and working out. (F12, Q14)

In 23 family groups, adult family members (and some children) compared the experience in a hands-on institution like Eureka! and in a hands-off one. It appeared that all of them had visited traditional museums and through the comparison they could better express their ideas about what type of experience a visit to a hands-on institution is. These relationships are expressed in opposed pairs[47] (figure 6.5).

As seen from the diagram, a sharp distinction was made between hands-on and hands-off institutions and the type of behaviour they stimulate. These pairs show some of the fundamental distinctions by which such institutions were perceived by the family visitors to – and to a large extent they do – organise themselves. The analysis can be taken a stage further by including institutions which are in-between the two extremes[48]. This shows us a number of interesting patterns. Thus, hands-on institutions were associated with exploratory, self-directed, multi-sensory, participatory learning; they are accessible and child-oriented; they explore alternative ways of presenting ideas and concepts; they make learning 'easier' and 'fun'; children stay longer and do not get bored or tired; one of the media of communication they use is purpose-built exhibits which are unbreakable; they offer visitors a series of choices of things to do; they are more relaxing for adults and children as there are no physical or intellectual constraints and the code of behaviour is quite loose.

On the other hand, family visitors associated hands-off institutions with not being able to use all of their senses and making learning boring; they are adult-centred and child-unfriendly; ideas and concepts are presented through static objects and written text; visitors become aware of time and fatigue; they use static objects in glass cases which are not to be touched and are of high value; visitors are expected to stand and look at exhibits; the behavioural code is very strict imposing a series of constraints especially for

[47]These pairs are abstract categories based on the data. Key words that family members themselves used are presented in inverted commas in the text.

[48]Where they incorporate hands-on exhibits with static ones or hands-on exhibitions along with more traditional ones.

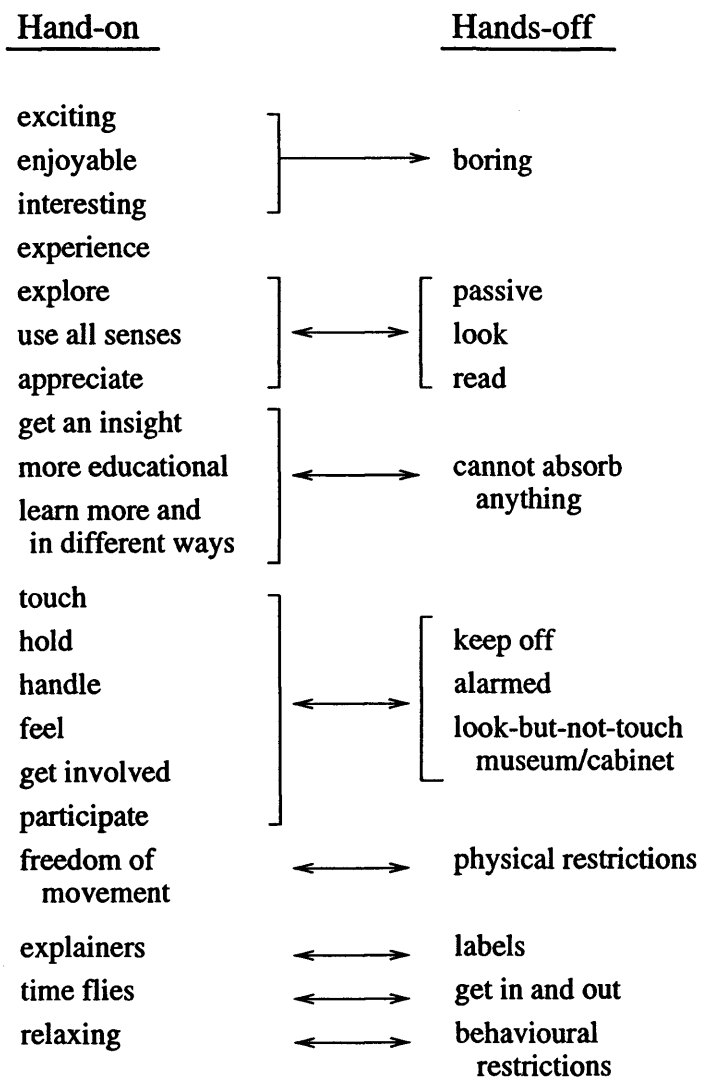


Figure 6.5. *Characteristics of hands-on and hands-off museums according to the families.*

family visitors; and this makes the experience frustrating for both adult and child family members as they are both aware of more things they cannot do than do.

Adults seemed unhappy at the prospect of having to worry about children's behaviour and whether they will break anything. Children were also unhappy about 'being told off and bored'. One adult mentioned that they did not visit museums where there is nothing for the children to touch. The adult family members in two groups believed that both types of institutions have a place while one of them thought that a mixture of both would be the ideal museum. Visitors in both families argued that there needs to be museums where artifacts from different cultures are preserved and exhibited and could understand why some of them cannot be handled. The following quote is a particularly explicit example of the discussion between a couple:

M: We went to a nautical museum. They didn't like it.
W: Because it's a reading one.
M: It has to do with these nautical signs and there're ships and lots of things are in glass cases, ships and old uniforms that they used to wear in the submarine. Well, there's nothing really hands-on. There's buttons to press and watch machinery go round but there's nothing as nice as this. So yes, I prefer this kind of museum but some of the nautical signs from the old ships they're too old to touch. But for the children this is far more interesting.
W: I think they both have a place. As M. says the older things are interesting to look at. So you couldn't possibly touch all those old manuscripts and old ships and things like that. I think it's very important that we do preserve them in places like museums for all people to see but not for children, certainly not for them.
M: We need something between the two, something like the M. one where you can go an hour or two and unwind. (F12, Q14)

Four adult family members noted that there is a 'movement within museums' to incorporate hands-on exhibits, to become more accessible and child friendly and, hence, family friendly. In only one case, an adult family member said that the word museum is not an accurate description of Eureka! as it is rather 'a place of exploration rather than understanding'. For him a museum is a place 'where you've got lots of old things on show either dinosaurs or whatever it might be' and it is always associated with history.

6.6 Conclusion

The families in Eureka! seemed to have quite different agendas from those families visiting Xperiment at the MSI. More women than men visited Eureka! Most of the adult family members were from the age range 25-44 and were visiting with children between the ages of 5 and 12. A large number of the adults (one-third of them) were highly-educated as compared to those at the MSI. The vast majority were middle-class white British people. There was a relationship between their occupation and the subject of the exhibitions, as was the case with the MSI.

The adult family members perceived Eureka! as a place where they could have a day out with the children and where children could learn and enjoy themselves. It is a unique place which the children had to experience as part of their childhood. For many families, Eureka! had been in their list for visiting for quite some time. Having children or having a child guest was often mentioned as one of the main reasons for visiting. Furthermore, the majority of the children wanted to visit Eureka! because they had been before and enjoyed it or because it was strongly recommended to them by friends. In some cases, it was the children who persuaded the whole family to visit. Being able to touch was what attracted the children the most and kept their interest levels high throughout the

visit. This also attracted the adults. They seemed to believe that providing hands-on experiences encourages children to learn and that this is the natural thing for them to do. Thus, the majority of the visitors referred to the educational aspect of Eureka! as the main motive for visiting (this is also what the adult family members visiting the MSI said).

Family groups used all information available to them to plan their visit. Their plans – quite open and flexible – included seeing the whole site. In some cases, family members planned to do or to see specific exhibits but their agendas were generally quite flexible and open to influence by Eureka!'s agenda. Children mainly expected to experience specific exhibits and to be able to touch. For the adults fulfilling their social agenda was more important than their own expectations. In most cases, adults (parents and grandparents alike) did not have any personal expectations. As far as the social agenda of the family groups is concerned, parents used Eureka!'s resources as a means of influencing their children's educational experience. Grandparents were only concerned with their grandchildren's entertainment.

Family groups read the exhibitions in terms of: everyday things and how they work, and learning about one's self and others. This process revealed how these readings were determined and the interrelation of cultural patterns, the personal and social agenda of the groups. The exhibition and its themes came across as physically and intellectually accessible to people of all ages, children in particular, due to the communication approach employed. Family members particularly enjoyed participatory exhibits which involved all senses. The Eureka! experience made many of these family visitors change their attitude towards learning. It also made them more aware of their own development. The adults appreciated the fact that children's needs were taken into account. However, a few were concerned about what children learn. On the other hand, the children focused on the kinaesthetic aspect of the experience and the feeling of freedom and choice this gave them.

Summary Eureka! is a Museum designed for children. This message has clearly been communicated to its audience. The child family members who took part in this research were very much in control of the visit. Eureka! has been very popular amongst child visitors since it opened. This remark is supported by the adult family members who visited Eureka! for the children. Eureka! was perceived as a place that children should visit as part of their childhood. Children's agenda for the visit was quite dominant due to lack of personal expectations and fixed visit plans on the adults' side. However, children's learning was on the adults' agenda for the visit. They believed that hands-on is the best approach to learning.

The exhibitions in Eureka! provide a clear structure and reinforce regularly the main messages through the support material and social interaction with the enablers. In addition, the child family members were motivated, could concentrate for a long time and were able to work most of the exhibits on their own. Hence, the adults did not feel the

need to 'teach' them what the exhibits were about as was the case at the Xperiment! However, the family agenda and their preconceptions influenced the way the exhibitions were read and reconstructed. Although these reconstructions were close to the messages the exhibition team tried to communicate, they did not reflect the different levels and nuances of the messages. The communicative approach employed also influenced the reconstructions of the exhibitions. This was evident in the reconstruction focusing on 'how everyday things work'. In the case of Eureka!, everyday things were used as a means to show visitors not only how they work but also how they have changed and to enable them to make comparisons. On the other hand, the use of everyday things as museum exhibits enabled the family members to relate to them and changed their attitude towards science and learning.

Chapter 7

Case Study III: The Archaeological Resource Centre (ARC) in York

7.1 Introduction

This chapter presents the third case study, namely the Archaeological Resource Centre in York. The analysis is based on the family interviews, unobtrusive observations and children's drawings. It is organised in two parts. The first part (sections 7.2 and 7.3) explores the personal and social expectations, needs and desires of the family members. It starts by presenting the profile of the 29 family groups who took part in the study and their ideas about the visit to the ARC. This includes their motivation for visiting; practical considerations; frequency of visiting; visit plans; the personal and the social context of the visit, and the factors that influence it. The second part (sections 6.4) will look at the family visit to the ARC. In particular, it will present the alternative ways the exhibition was perceived by family members and references to the personal and social agenda. Finally it will discuss visitors' ideas about archaeology and history, and about hands-on museums. Throughout the chapter comparisons between the three case studies are drawn.

7.2 Family profile

Twenty-nine family groups were observed and then interviewed at the Archaeological Resource Centre (ARC) in York. It included 47 adults (25 women and 22 men; table 7.1), one young adult (young man) and 45 children (23 girls and 22 boys; table 7.2). There were twelve single adult family groups, seven of which included a woman and five of which included a man (table 7.3). Thus, there was almost an equal number of women and men, and of boys and girls. However, both of the above findings may be affected by the fact that most of the family interviews at the ARC were carried out on a Saturday. This means

that it was more likely that the whole family would visit. Yet, in total there were as many adults as children, a finding which is consistent in all three case studies. Furthermore, there were even less family groups where the adult was a grandparent compared to those visiting the MSI and Eureka! There were only three such groups, two of which included other adults who were the parents of the children[1].

women	25
men	22

Table 7.1

Gender and number of the adult and young adult family members.

girls	23
boys	22

Table 7.2

Gender and number of the child family members.

women	7
men	5

Table 7.3

Single adult family groups.

Slightly more than half of the adult family visitors were of the age range 35-44[2] (table 7.4). Although these age groups were overrepresented (compared to the general population of the UK) in the previous case studies this is much more prominent in the case of the ARC[3]. There were more under 5s and less teenagers at the MSI and at Eureka! as compared to the ARC (table 7.5) which could reflect family visitors' image of archaeology.

More than half of the adult family members were highly educated and from a middle or upper-middle class background (tables 7.6 and 7.7). There were no family visitors from an ethnic background. The vast majority were English apart from two groups who were from over-seas (North America) but there were living for a period of time in this country at the time of the interview. Eighteen adult family members had a University undergraduate degree and another seven had a postgraduate degree. A number of adults (10 people) left education after they completed the compulsory level. One of them, however, went back

[1]Nine such groups visited the MSI, and five visited Eureka! This age group seemed to be underrepresented compared to the general population in the market research conducted by the ARC (1996).

[2]This age group constituted 38% of the respondents in the ARC survey (ARC, 1996) while more than two-thirds of the child family visitors were from the 5-11 age group.

[3]There were thirteen family groups that included at least one adult between the ages of 35 and 44 and at least one child between the ages of 5 and 11. There were only three 4 year old children from the 0 to 4 age group while there were seven teenage children between the ages of 12 and 15. In the previous case studies, the proportion was the opposite.

16-24	1
25-34	8
35-44	26
45-54	9
55+	3
total	47

Table 7.4

Number of the adult and young adult family visitors by age.

0-4	3
5-11	35
12-15	7
total	45

Table 7.5

Number of the child family visitors by age.

to gain an 'A' level and was planning to start a history degree in a few months time. In total there were eight adult family members whose studies or occupation was related to the subject matter of the ARC. All of them were women.

Minimum	10
Stayed on at school	8
Undergraduate degree	18
Postgraduate degree	7
Still in full-time education	0
NA	4
total	47

Table 7.6

Educational background of the adult and young adult family visitors.

In terms of the socio-economic background, there was a large number of adult family members from socio-economic groups B and C1. They are approximately the two-thirds of the family visitors (in this study) to the ARC. Although there were visitors from the A, C2, D and E groups, they were only a few compared to those from groups B and C1 (table 7.7). The recent visitor survey carried out by the ARC (1996) did not include any questions on the socio-economic or ethnic background of its visitors. Some anecdotal evidence (11/1994 pers. com.), which suggests that the typical ARC visitors (excluding organised educational groups) are well educated, middle-class white people, support the above findings.

It is quite difficult to determine whether the family groups in this study are the typical

Status	Women	Men
A	0	2
B	3	10
C1	11	5
C2	3	1
D	1	1
E	0	1
Homemaker	5	0
NA	2	1

N=46

Table 7.7

Adult family visitors by socio-economic status in this study.

ARC family visitors. To date, descriptions of the ARC audience have been gained through self-completed questionnaires. As this sample is self-selective rather than random in nature, the audience information may not be very accurate. A more systematic demographic survey of visitors to the ARC is needed to describe the visitor profile.

7.3 Socio-cultural patterns

This section will discuss the motivation of family groups in visiting the ARC. Family visitors chose to visit the ARC for a variety of reasons. These fall into wider socio-cultural patterns which influence museum visiting.

7.3.1 Why visit a hands-on museum?

The families visited the ARC for different reasons. This was true for the vast majority of the groups although some of them did not mention all of their reasons when directly asked. However, their motivation became clearer as the interview proceeded. As was the case with the family groups at the MSI, it took some of the child family members at the ARC a few minutes to become familiar with the interviewer and start talking.

Below are some typical reasons for visiting:

W: We went to the Jorvik Centre yesterday and we saw an advertisement and I'm a history graduate and I actually really want to do archaeology so I've always been interested in archaeology. C. has been doing an archaeological project for school, haven't you?
G: Yes, and//
W: //And she wanted to know more about archaeology. (F16, Q1)

W: Well, it was because we've seen an advert before so I thought it would be a good idea to bring her here 'cause I know she likes, she's interested in archaeology having watched the series on TV, the Time Team. She was quite interested in that so I thought she might like to see this place, see how it worked.
G: At school we've been doing about Romans and that. (F27, Q1)

In 21 family groups out of the 29, it was actually the adult members who discussed the reasons why they decided to visit. In some cases, they mentioned that it was the children who persuaded them to visit or that they were doing it for the children's sake because they thought they would be interested. In other cases, a visit to the ARC was something that the family had wanted to do for quite a while and it was a matter of finding the time to do it. It was clear that they thought there would be something for everybody to do as this family member very explicitly mentioned:

W: Well, it's something that we can all do instead of just taking him out and entertaining him. It's educational. (F10, Q1)

Although it seemed that it was mainly the adults who made the decision to visit, there were six groups were adults and children shared their reasons for visiting. In this case, the children contributed to the conversation either by picking up on something the adults said or by adding their own reasons. In addition, the child family members in two groups provided their own reason for visiting on behalf of the group.

Hence, family visitors at the ARC responded more like those at the MSI where the children seemed to need more time to get involved in the conversation and to leave most of the decision-making aspects of the visit to the accompanying adults. However, a lot of the children seemed to be highly motivated and to have assumed a special interest in archaeology.

The section below will discuss in detail the main ways in which family members expressed their motivation for visiting the ARC together with some practical considerations.

7.3.2 Cultural itineraries

As mentioned above, although the itineraries arising from the data are the same for all three case studies, each institution is perceived to feature higher or lower on these itineraries. A great number of family visitors referred to a kind of list of things to do as part of their visit to York. Thus, in most cases the visit to the ARC was very closely connected with the general area of the city of York and the way it is perceived by families. As a result, the cultural itineraries which are in operation in the case of the ARC are weighted differently. Education is the one valued the most followed by the place itinerary. The visit as a family event comes next while the entertainment and life-cycle itineraries are those mentioned the least often.

Education itinerary (25 out of 29 family groups) Like the previous case studies, the education itinerary can be divided into two categories. One of them relates to a specific interest in the subject matter of the exhibition expressed both by the adult and child family members. The other one refers to a more general educational interest which was mainly expressed by the adults (8 adults and 1 child). They mentioned that they were in favour of the communicative approach adopted by the ARC. They thought that 'touching' or 'doing' things is a good way to become interested and learn about archaeology.

Slightly more than two-thirds of the above family groups (18 out of the 25) included members who expressed a warm interest in archaeology and/or history. Their interest arose from their contact with the subject. Each one of them told their own memorable experiences of their first contact. There seemed to be four main sources from which family members gained information about it. Five of them mentioned that they were watching a TV series called 'Time Team' which was shown around the period of their visit to the ARC.[4] Members of all five family groups were very enthusiastic about the series which they watched every week. The following quote is a particularly explicit example. The adult family members also mentioned the way he first found out about the ARC:

> M: My daughter is very interested in the Romans. She loves Roman archaeology since there's been a programme on television about (...) Time Watch {refers to the Time Team programme}, I think, she wanted to find out about an archaeological dig and we've been into it, haven't we? Since that we've been fascinated by Romans. We thought this {the ARC} would be a Roman (...) although a lot of things were. We've been to the Y. museum and had a look around in the museum. We've always meant to come here. We live in York. We've been to the C. museum; we've been to the one in the park, Y. museum. We haven't been to the Viking Centre yet.
> G: Not yet.
> M: And it's a, (...) I didn't know about this place until, (...) My daughter goes dancing just across the road on Saturday mornings and we, today we had a free Saturday. You {to G} would like to go on a dig, you know, watching it at the Time Team she would say 'can we go on that?' Maybe if we knew where and when but (...) So that's really how we got here. We read about it, ehm, {tries to think of the exact words} 'it's on hands-on stuff for the Romans'. (F13, Q1)

Thirteen family groups mentioned that they enjoyed visiting museums or similar places. For two of them, this was their first contact with archaeology as a subject. However, the

[4] 'Time Team' brought together a team of archaeologists from different backgrounds and specialities who worked together on a task. It involved following up information on possible archaeological sites which had not been explored; developing hypothesis about how the place could have been used and by whom (depending on the case); determining the exact area where the dig would take place based on evidence; carrying out the dig; identifying, dating, studying and presenting the findings; and developing a story or a theory to explain their findings.

rest were exposed to other experiences. The following is a typical example of this point:

B: We went to the Viking Centre first and when I'm older I want to be an archaeologist. I don't want to be really a person looking for dinosaurs but I want to look for, ehm, humans.
{I: did you decide that before your visit to the ARC?}
B: Oh, yes, years before.
W: Oh, yes.
B: I've got a couple of shells and rocks which I collect.
{I: how did you decide to become an archaeologist?}
B: Well, we live near N. and there's a natural history museum there and there's a lot of things in there and I just got so interested in that sort of things. I just thought 'why can't I collect?'.
W: He's fascinated by that sort of things. We live in Northumberland and, and there're lots of wonderful places there in order to explore rock formation. I think it gets in your blood really {laughter}. (F9, Q2)

Another stimulus (for 6 family groups) was history classes/projects at school. However, it was not only the children who were interested in archaeology. Adults also had an interest of their own in the subject. Hence, there was something for everybody to enjoy:

W: Ehm, we've been to Jorvik and M. has got a history project for the school.
B: Yeah, we've done about the Romans at school and the Greeks. (F14, Q1)

One of the things that helped some children to take up an interest in archaeology was collecting things and 'digging', usually in the garden. In total, twelve children mentioned that they had been involved in such activities. For example, one child mentioned that he collected coins whilst another three said that they wanted to become archaeologists (cf. extract F9, Q2 in page 188). Two of the children who wished to become archaeologists specified that the decisive factor was visits to museums with archaeological collections. One of them was interested in 'digging', was a collector and frequent museum visitor.

Thus, 22 family visitors seemed to have a special interest in archaeology or history which in a couple of cases it was quite specific, for example an interest in Romans or Vikings. This interest was usually linked with activities like museum visits, digging excursions, collecting objects, all of which were encouraged by the adult members of the families. In seven cases, the adult family members shared the interest in archaeology and/or history.

Family members in nine groups out of the 25 seemed to be particularly interested in the interpretative approach of the exhibition. They referred to the hands-on aspect of the exhibition as something interesting in its own right. In eight of these groups, the adults knew that it was a hands-on experience and felt that it would appeal to their children:

W: I thought they would like to be some place where they would touch, ehm, archaeological things and see how it is done. (F25, Q1)

W: Basically, I saw it advertised and I just thought it is far more interesting for the children to be able to, instead of have a look, to have a go, to do the hands-on bit basically. This is what they want. (F29, Q1)

Only in one family, the child had heard about the ARC from her school teacher. The 'doing' aspect of the Museum was so appealing to her that, as far as she was concerned, this was the 'Touching Museum'.

In twelve groups, the motivation for visiting was to learn or to have a broader educational experience. The terms they used were, apart from 'education', 'to learn about or to learn in a different way', 'to discover' and 'to know/to get knowledge'. They considered the experience to be 'educational' or 'more educational' compared to similar ones and to provide a 'stimulus' for further exploration. The adult family members in four groups related the visit to school learning while another one believed that visits to the ARC 'will help them {referring to the children} with their lives one day'. A number of family visitors (in 7 groups) used the terms 'interesting' to describe the Museum and its theme. Only one of them was a child. Another adult family member referred to family learning as taking place at two levels, at an individual level and at a family one[5].

Place itinerary (20 out of 29 family groups) A visit to the ARC was seen by family visitors as something that they chose to do as part of their visit to York[6] (or Britain). This list of 'things to do' was closely related to the history of the city of York and included various tourist sites (from museums to churches, famous streets, botanical gardens and heritage sites). It also included other activities such as going shopping[7] and watching fireworks.[8]

This idea of having a list of 'things to do' came up very often in the conversation. This was much more evident in the case of the ARC than it was in the previous case studies. York is a famous tourist destination with a whole range of tourist attractions. The same

[5]This relates to the idea of the social aspect of learning (McManus 1987, Hilke and Balling 1985, Borun 1995).

[6]As mentioned above, a large number of the families (16 groups) were on holiday or on a day trip in York. The vast majority of them wanted to visit the ARC together with a number of other venues in the area. These points are supported by the visitor survey conducted by the ARC (1996) which found that a high number of the respondents (86%) had visited other attractions on the same day. Actually 81% stated that they had visited one to three other venues in York on the same day. Ninety-two percent of the respondents were in York on holidays or for the day.

[7]The ARC (1996) visitor survey revealed that 37% of the respondents combined a visit to the ARC with shopping.

[8]This was organised as part of the Viking Festival which takes place every year. It is usually during the second half of February and coincides with the winter half term for schools.

kind of pattern seemed to emerge in the case of the Science Museum (Macdonald, 1993) where again the visitors classified 'museums as part of a tourist experience'. Adult family members in 18 groups referred to their visit to the ARC as being one of their itineraries which would be ticked off when it was done. In the cases where family groups failed to 'do' the museum during their previous visit to York, they mentioned that they had returned to see it. The following quotes are typical examples of this point:

M: Yeah, yes. We've come to York for the day so this is one of the places we've listed to come. (F18, Q2)

W: We went to the C. museum a few weeks ago, ehm, and we were going to come here then but we didn't have time so we came back this week. (F22, Q2)

M: We mostly (...) we just decided that we were going to do something special and we looked at the things we could do and what things we could do around this {the visit to the ARC} as well. We want to walk the Walls. (F1, Q2)

The fact that York has such a long history and a tradition in archaeology made the place itinerary even more significant. Witness the following:

M: Because we've toured places in the UK and most of the history it seems like it's best explained through archaeology and I know that the children have an interest to see how history is determined. (F25, Q1)

M: To discover things about the historical side of York really and archaeology is part of that. (F30, Q5)

M: We thought it would be good. I mean the Jorvik Centre is so particularly well-done. York obviously takes its archaeology seriously so we presumed that this would be done similarly in a professional and serious way, ehm, yes. It's very interesting indeed. I'm very impressed. (F16, Q3)

The place itinerary also comes into operation when people have visitors. There were two family groups who had visitors and planned to 'show them around'. The following extract is an explicit example of this point:

W: I. has seen it before and it was his idea to bring me here because I have not been here before.
B1: I found it on the map.
W: You thought about it last night, didn't you?
B: Yeah.
W: Because daddy told you that I was coming here. He asked you where you would like to go.

B1: Yeah, he said 'we're going somewhere. You can choose where we should go'.
W: That's right, yeah. (F21, Q2)

The above quote is also an example of family event itinerary, an occasion for the grandmother to spend time with her grandchildren doing something which she had not done before which the rest of the family enjoyed doing.

Thus, the ARC – together with similar venues – seems to be one of the places for family visitors to York (and, indeed, any visitor) to see. These are usually places which are appropriate representations of the city of York or even Britain. Indeed, the ARC offers what people associate with York (and perhaps even more). There is a lot of archaeology and history, Romans and Vikings, real objects and hands-on experience under the same roof.

Family event(14 out of 29 family groups) Fourteen family groups referred to the family aspect of the experience in particular. In addition, there were another nine families who mentioned that they went to York on holiday (during half term or at weekends) implying that this was something special for all family members. However, these families are not included in this itinerary since they did not refer to it explicitly.

As seen in the previous case studies, free time or time off was important for this itinerary. It was an opportunity for family members to spend time together doing something out of the ordinary that they would all enjoy:

M: We did it as a treat. We live in (?) which is a village outside York. (F1, Q1)

M: We like doing things together, don't we?
G: Yeeeah! (F13, Q5)

W2: We just came for the day and just (...) something different really, isn't it? Hadn't it been for these I wouldn't come in here on my own. (F20, Q5)

One adult family member mentioned that they had a special arrangement for the family outings which allowed them to get all together as a group and also family members to do things they enjoy in pairs:

W: And it's also me trying to be with her because it's your special day with me, isn't it, today?
G: Mmh.
W: My husband and I both work during the week and we've got a son and a daughter and we like going out walking some times but he's gone out (...) well, you don't like that {laughter}. My husband and my son have gone out walking, special for him {refers to her son}, so this is special for you {talking to her daughter and then turns to the interviewer} special day for her. So we're doing something she'll enjoy which

we can't do during the week because that's what it's about really and it's a bit of education and you learn something in a different way and you enjoy it. Yes, today we were doing something one-on-one.
{I: how often do you do that?}
W: Every now and again, just for us to have some time one-on-one.
{I: is it a father-to-son and mother-to-daughter thing?}
W: No, it's just a different way of doing things as a family and then something that it's special for them. (F5, Q1)

Having a 'day out' with the rest of the family seems to be an important reason for visiting the ARC. It is an experience that brings family members together on holidays or special days in the family calendar.

Entertainment itinerary (9 out of 29 family groups) Some family groups discussed their motivation for visiting in terms of the children's or the family's entertainment. Friends of one family had been before and recommended the ARC as enjoyable experience while another four families had been before and had enjoyed it. Children's enjoyment has been important for family groups in all three case studies, especially for those visiting Eureka!

In all but one case it was the adult members of the family who referred to the experience as enjoyable. The terms they used were 'to keep entertained', 'to enjoy' or 'enjoyment', and 'to have a nice time'. Family members seemed to associate (or to compare) enjoyment with various ideas. Thus, family members in two groups referred to the relationship of enjoyment and learning. One of the groups described them as two different things which cannot take place at the same time:

M: Well, did you expect to learn anything?
B: No.
M: No, just play with the computers.
I: What do you enjoy about them?
B: You don't have to type down.
M: He likes the graphics.
B: Yeah, just enjoyment. (F11, Q5)

According to this, it seems that learning and play are opposites. On the other hand, the adults of the second family group saw no contradiction in learning and enjoying themselves:

W: We expected to enjoy ourselves and learn new things.
M: Yes, yes, as a family and individually, yes. (F16, Q5)

The latter is also an example of how the visit was perceived to be a social and personal experience at the same time.

On another association two family visitors made referred to the idea that 'being able to touch' or 'to interact' is a much more enjoyable experience than visiting an exhibition with static objects:

> M: Oh, basically something interactive, ehm, that would keep us entertained and interested in.
> W: Not just a museum really where you see things in cases. It's a lot more enjoyable. (F10, Q2)

> W: {...} We have been to lots of museums and G. doesn't really like museums because you can't touch anything. You feel you look at something but you can't touch it and, you know, by the end of it you haven't enjoyed it much. I haven't enjoyed it much because the time around, (...) you know, things like 'be careful', you know. And nowadays often the museums are alarmed, have alarms over things so if you touch {laughter}, you know (...). This is a touching one that's why we came, wasn't it? (F5, Q1)

As was seen in the previous case studies, entertainment is often mentioned together with learning. Being allowed to touch and participate is what makes the experience enjoyable and/or educational.

Life cycle itinerary (8 out of 29 family groups) This itinerary is very much related to the idea adults have of childhood. Thus, it was seen as something that one should do when one has children or grandchildren. Visits to the ARC and similar cultural venues was seen as an important part of children's development. This was more evident in the families where the accompanying adults had visited museums when they were young. The following quotes are typical examples of this:

> W: What is all about, what actually archaeology is and how we can find out about the past as I was hoping that they could get interested in. That's the way I got an interest in it as I was visiting such places with my parents when I was little. Basically, to give them an interest to find out more. That's a way of getting more interested in things than just looking at boring old books. (F29, Q5)

> W: I've been before with a school group, late teenagers, and I just felt it'd be, children would enjoy it. I've been on my own with a school party like, ehm, an older school party and I just thought that next time we came to York we would bring the children down so that they'd enjoy the special hands-on experience. (F23, Q1)

For this itinerary the age of the children was important and this usually included primary and also, due to the subject matter in the ARC, secondary school age children[9].

[9]Secondary school age children were underrepresented in the previous case studies.

Although the vast majority of the adult family members themselves did have an interest in the theme of the exhibition, the needs of the children were specifically mentioned. This was even more apparent in the case of a group where the adult came for the children's sake only. This is a typical example of the above point:

> W: Well, now that she's a little bit older than before {laughter}, she's at school, we're going around the museums (F26, Q1)

The above extract is a good example of the adults' intention to influence her daughter's educational experience. It can also be said that it reveals her expectations of the museum visits and her hope that these visits will perhaps influence the way her daughter thinks and help her in her life.

7.3.3 Planning the practical side of the visit

Practical issues such as the weather, time availability, the entrance fee and the distance the family group has to travel to reach the Museum were taken into consideration before the visit. Only six family groups referred to external factors affecting the planning of the visit compared to eighteen families at the MSI and eleven at Eureka! This could be because a large number of families (16 groups) were on holiday part of which was doing a number of activities. Thus, for example, time and proximity should not have been a problem.

Among the family groups who were living locally, one mentioned that they lived close to the Museum which was convenient. Another two groups said that they only had a couple of hours to spend and a visit to the ARC fitted very well with their programme. One of these groups had separated since some of them wanted to go shopping and the rest did not. In addition, they mentioned that they had wanted to visit for quite some time and it was only a matter of having some free time to do it.

Two family groups had acquired discount vouchers for a number of cultural activities amongst which was a visit to the ARC. Although this was not the main reason they visited[10], it seemed to have played an important role in the families' decision to visit on the particular day. Furthermore, the adult family member in one of these groups was unemployed at the time and, hence, money could have been an issue.

Due to the large number of families who were visiting York as tourists, the families who visited York for the day had to plan the practical aspects of their visit. Moreover, in six family groups the visit to the ARC was not seen as a separate activity. Hence, they talked about it as part of the whole visit to York. Their main concern was 'to make the most of their visit'. This meant that they needed to make sure that they could do all the things they wanted to in the time available. Some of the practical issues concerned the location of the ARC, opening times, time availability and food.

[10]Both families visited museums often. One of them visited the ARC regularly.

7.3.4 Frequency of visiting

A large number of families (21 groups) had not been to the ARC before[11] (table 7.8). Two of them came from North America[12] originally but were living in this country at the time of the interview. Both of them were visiting museums and heritage sites. Ten of these 21 groups also mentioned that they had been visiting other museums, in particular archaeological or history museums. In six groups, at least one family member had visited the ARC before. In five of these groups, it was a child family member who had visited before with another family member or with school. Moreover, two out of the six groups were regular museums visitors. There were only two family groups who had been to the ARC together before. One of them mentioned that they had visited four times together. In the case of the other family group, the child had visited four times before while the adult had been once. The child family member said that she had been with school and with other family members on the previous visits.

number of visits	number of family groups
first visit	21
repeat visit(regular visitors)	2
repeat visit(at least 1 family member been before)	6

Table 7.8

Frequency of visit to the ARC.

Eighteen families had visited some type of archaeological museum (or an exhibition within a museum) before. Among the families interviewed those with children from the age range 7 to 13 were more likely to visit archaeology museums more often.

7.3.5 When was the decision made?

For the vast majority of the families, a visit to the ARC was something they wanted to do for quite some time[13]. However, 21 family groups were more specific about when the decision was made. Eight of them said that they decided to visit on the same day. Seven of them planned to visit before they left home while the other one decided when they were on the train to York. Three decided the day before the visit and another three within the last week. Three more family groups planned their visit a few weeks before. A further four groups mentioned that they had decided to visit the ARC on their next trip to York. This decision was made some time within the last year. As mentioned above, in six of

[11] According to the ARC visitor survey, the number of first-time visitors to the ARC was as high as 87% (ARC, 1996).

[12] Visitors from overseas constitute 15% of the ARC visitors; 42% of them come from North America (ARC, 1996).

[13] According to ARC figures, although more than half of the visitors had heard about it before, only 11% had visited before.

the family groups it was actually the children who decided to visit and persuaded the rest of the family. In addition, a couple of families mentioned that it was a decision that the children and adults took together.

These findings are quite consistent among all three institutions. Families were aware of the various museums they could visit with children during their free time but they decided to visit only a few days earlier.

7.3.6 Why visit the ARC?

The place of the ARC on the cultural itineraries is the first step towards understanding the reasons why the family groups visited the ARC. For a large number of family visitors, the subject covered by the exhibition was a strong motivation for visiting. This was supported by the fact that York is closely connected with archaeology, something that most of the family groups seemed to be aware. Thus, archaeology is not only literally part of the City of York, from the Roman Walls to its buildings, but it is also an important part of the City's image. Thus, it appears that York is one of the places to visit when one is interested in archaeology and wants to learn more about it.

York is also one of the places to visit with children. Sixteen family groups were on holiday or on day trips. Furthermore, twenty of the families interviewed mentioned that they visited for the children or because the children asked them to. That does not mean that the adults were not personally interested in the Museum. In six family groups, the adults came because the subject of the exhibition related to areas of their lives such as their occupation or courses being studied.

As noted above, for nine families it was specifically the hands-on aspect of the exhibition that attracted them. In the majority of the cases this was associated with having children and the fact that it is much more interesting for them. Given that more than two-thirds of the groups had not visited the Museum before, the source of information was word-of-mouth[14] (9 cases) and printed material[15] (7 cases). In addition, one family group who mentioned that they visited York and the ARC regularly (had been four times the last two years) had used a special offer provided by British Rail. This special offer was valid for passengers from Manchester to York and offered them discount tickets to museums, heritage and tourist sites, bus tours and restaurants. Discount vouchers were also one of the things mentioned by ARC visitors (9in prompting them to visit (ARC, 1996).

In fourteen cases where a family member had been to the ARC before, they were the main source of information for the rest of the family members. In all the above cases where

[14]Especially, personal recommendation coming from family or friends (in particular those who have visited with children) seemed to play a significant role in the decision-making process. In the case of two families, this was mentioned as the single reason for coming.

[15]Seeing a leaflet of the ARC or York and word-of-mouth were the most common reason that visitors admitted to have prompted them to visit (ARC, 1996).

family visitors lacked personal experience, the most common information provided referred to the hands-on aspect of the exhibition. This seems to have been a very important aspect of the Museum's image in attracting family visitors:

M: It was recommended to us by friends.
{I: do you remember what they said?}
W: Yes, that it was very interesting and very good for the children because they could touch things and see things for themselves. (F15, Q1)

Only two family groups had information about specific exhibits. In addition, one of them knew that there were volunteers to help them interpret the exhibits. This visitor's references to the volunteers is quite important since it is the only one made by family groups in any of the three case studies. As will be discussed in the second section of this chapter, there were a lot more family members who used information provided by the volunteers to reconstruct their visit.

7.3.7 Visit plans

The way the family groups planned their visit to the ARC reveals the type of agendas they had for the visit. As was the case in the previous institutions, the plans of the family groups at the ARC were influenced by previous visits to this or similar museums. Family visitors' responses to whether they made preparations or whether they had any specific plans showed that they were similar to visitors' responses in the MSI.

Three main categories of agendas can be identified according to the families' visit plans. There is a much larger category of family groups with an open agenda. They wished to see the whole Museum and, due to the way the visit was structured and the size of the exhibition, they did see it all or most of it. The second category included family groups who expected to see or to do specific things (either because they had been to this Museum or to similar ones before) but their agenda was quite flexible. The vast majority of them did eventually see all or at least most of the exhibition for the above reasons. The third category consists of families who had quite fixed agenda and therefore specific expectations of their visit.

(a) Families with open agenda Twenty-one family groups (all first-time ARC visitors) said that they did not have any specific plans. They wanted instead to see all of the Museum or as much as possible. Although there were certain things that they expected to be able to see in an archaeological museum or do in a hands-on museum, they were more likely to be influenced by the Museum's agenda. A very common response was 'we didn't know what to expect'. The following extracts are typical examples of this point:

W: No, not especially, did we?
B: No.

W: No. We just came out of interest and we didn't come for anything, you know, we didn't sort of, ehm (...), know what to expect. So we didn't actually have any plans particularly, did we?
B: No. (F9, Q3)

W: We didn't really know what to expect. We haven't been here before. We haven't looked at this {points at her ARC guide book and laughs}. We haven't planned (...). (F3, Q3)

One family member said that the plan of the visit developed as they went along. It was mainly crowded conditions in the exhibition area which determined the route they followed:

W: Well today it's been a bit difficult with the schools so we've really only done what was available to do so we've only gone where there was room. There were so many people. (F4, Q2)

Although the families with open agenda were first-time ARC visitors, they were frequent museum visitors and had previous experience with archaeological and, in some cases, hands-on museums.

There is some indication that the lack of specific visit plans does not mean that the family groups were passive receivers of the Museum agenda. As was noted for the family visitors to the MSI, ARC family visitors were highly motivated people who were familiar with museums and the vast majority of them had decided to spend their free time at the ARC. They seemed to perceive it as a kind of investment for the whole family group. History and archaeology were things that they discussed, whether it was as a result of a TV programme, a museum visit or a special activity such as an object collection (cf. section 7.3.2).

Seven family groups mentioned that they had recently visited the Jorvik Viking Centre (cf. chapter 3.4.3). This visit gave rise to some expectations of what the ARC experience might be like and influenced their agenda for the visit. These mainly referred to the quality of the experience and the general feel of it. Witness the following:

W: No, no. We didn't know really what to expect. We knew it would be connected with York, the archaeology of York, but we didn't know whether it would be Viking or Roman - which is a bit of everything. {...} We have been to the Jorvik Centre as well so it gives you a bit of a hint what kind of things you might expect to find. (F27, Q2,3)

W: We've been to Jorvik so we had an idea of, you know, (...) In fact it would probably be better to do it the other way round because it would have given us an idea of how Jorvik occurred. (F7, Q2)

(b) Families with flexible agenda Six family groups mentioned that they did have some plans about their visit. This usually referred to their favourite exhibits at the ARC or those they could remember from their last visit. At least one member of the six families in this category had previous Museum experience. In all cases, it was the child family member who had visited before and wanted to come back.

Thus, at least some of the members of the families were familiar with the space and with what was available in the ARC. They seemed to have a clearer idea about what they wanted to do and what they expected. They had also talked about their previous experience with the other members of the family. They were familiar with the structure of the visit and seemed quite happy to follow it as long as it met their needs. Hence, their agenda was quite flexible and they were willing to accommodate into their plan activities offered by the Museum which seemed interesting. In all six cases, the visit was geared towards the children who were the only ones who had been to the ARC before. Thus, the adult family members seemed to be quite happy to follow their pace and do the things they enjoyed. The children were playing the role of guide, showing the accompanying adults what they did last time:

> M: No, just really give him the chance to come around and have a look at things without the rest of his class there and so that he could concentrate more on what was available.
> W: He's been showing us {laughter}
> {I: what did you want to see in the ARC?}
> B: I liked, I remember that we used the computers and I tried to//
> W: //But what things did you want to do?
> B: I liked sorting out the finds. (F10, Q3)

They also went on to say that they had to move really quickly through the first section and that they planned to go back to do that again. They would also go to the shop because the boy wanted to do that. Thus, the plan was being negotiated during the visit. The next extract describes the movements of one of the families throughout the exhibition and the decisions family groups made regarding things to do (negotiation process):

> M: We went in the shop and stayed there for a minute or two, we looked at the video and then we moved on into it. We followed, to begin with, we followed as a group; we all went to the padlock and then B. went to the weaving and we followed soon afterwards. I think G. went to the shoes. We missed out, like, (...) the far end with the computer consoles. (F2, Q3)

(c) Family members with fixed agenda This category consisted of two family groups who were frequent ARC visitors. They knew the Museum very well and they wanted to do or to see specific things. One of those groups had quite a fixed plan which

was not influenced by the Museum's agenda at all. Both family members in that group went directly to the computers where they spent their entire visit. They neither watched the video nor did they use any of the activities although the volunteers invited them. This was a case where the child family member planned the visit:

{I: what things did you plan to do or to see?}
B: To go on the computers.
M: He only wanted to use the computers. (F11, Q1)

Computers and, in particular computer graphics, seemed to be this boy's favourite subject as his father mentioned during the interview. Hence, it seems that the dominant agenda was that of the child and that it was quite a strong one so that the Museum could not influence it. The boy said that he did not come to learn anything but to enjoy himself. However, learning was an important aspect of the adult's agenda. He stayed with his son throughout the visit, discussed the programme with him and exchanged ideas. He felt that visits to the ARC could help his son think about the issues involved and develop positive ideas about history and how things change.

The other family group in this category consisted of one adult (mother) and one child (daughter). The purpose of the visit was two-fold. The woman was an archaeologist by profession and she knew from her previous experience that there are always new things to see in the ARC[16]. The other reason for visiting was that her daughter was doing the Vikings at school. The girl mentioned that she did not want to come at the beginning but then she changed her mind because she was interested in Vikings and wanted to find out more about them. Although it seemed that the dominant agenda was that of the adult, the observation helped to determine that the young girl chose which activities to do and spent more time looking at the ones related to the Vikings. Thus, their agenda for the visit was rather subject-specific than object- or activity-specific. In the case of the latter family, the ARC was used as a resource for self-directed learning which helped the family members with other areas of their lives.

The discussion above revealed that the way the family groups planned their visit to the ARC relates to the previous experience of its members and their special interest in the field and also to their motivation for visiting.

7.4 The context of the visit

This section will explore what the needs and expectations of the family members were about the visit to the ARC; how these differ from adults to children; and also what the personal and social expectations of different family members were.

[16]This refers to new activities and to the artifacts on the shelves that visitors can see.

7.4.1 The personal context

As was discussed in the previous cases studies, the personal context of the visit is presented here separately only for practical reasons. It refers to the personal needs, desires and expectations of each family member as to that their visit will hold. It is influenced by the physical characteristics of the specific museum which is visited and its collections. It is also influenced by the social context (social agenda) of the visit.

Visitors' expectations Children's expectations seemed to focus on different aspects of the visit from those of the adults. Furthermore, as was seen in the two previous case studies, children were concerned more with their own experience than with the visit experience of the other members of the family. On the other hand, adults were equally concerned with their children's educational experience.

(a) Child visitors in family groups Children in 21 out of the 29 groups specified what their expectations were. The rest either did not answer or stated that they did not have any expectations in particular. Thirteen children seemed to have object-specific expectations relating to certain exhibits or activities. This pattern is repeated throughout the interviews in all three museums. Here are some typical examples as expressed by the children themselves:

> B: I wanted to go to the first section and see through the magnifying glass {refers to the environmental archaeology section} (F10, Q4)

> G: I did. I thought it might be peoples' skulls here but there's not. We saw some but not peoples.
> M: She was hoping basically that they would have human skulls here because on the Time Team when they dug they found such things. So she was hoping that she might find some here but we found an animal one, didn't we?
> G: Yeah, not too bad.
> {I: did you expect to see anything else?}
> G: Well, red brick or something because yesterday we went to the Museum Gardens and I saw it there. (F13, Q4)

Hence, it seems that these children had quite specific expectations. In slightly less than half of the cases, they expected to find the things they did during their last visit which they liked. The children who lacked previous experience got their ideas from visits to other archaeological museums or sites and from things they read or they were told about the ARC from family members who had been previously.

Children in five groups only seemed to have subject-specific expectations. These related to archaeology, history (or both), the Romans and the Vikings. All of the children in these groups had a strong interest in archaeology and/or history:

G1: I expected to learn about archaeology. I thought there might be various things and that was about all I thought really. (F16, Q4)

{I: what things did you expect to find in the ARC?}
B: About Vikings. (F17, Q4)

Children in six more groups expressed their expectations in terms of what they did not expect to find or to be able to do in the ARC. This revealed their image of museums and related directly to their previous experience with traditional museums:

B: I thought it would be like a different museum. I thought that there would be lots of things saying what they were but it was a real surprise when I came in and I noticed you could touch the stuff. (F1, Q4)

W: It was quite different from what we expected, wasn't it?
B: Yeah, we thought it'd be like a walk-round, look-at-things, press-button and stuff like that but it's not because you really get involved. I liked the fact that you could use (...) like you were archaeologist and you could make the shoes. (F9, Q2)

G: I just thought it would be like a museum. I didn't know that I would be able to touch the things and that. (F27, Q3)

The above extracts are excellent examples of the image these children have of a museum. It is a place full of old things with small labels which explain what they are; where you can only stand and look at things. It is interesting how the boy in the second example differentiated press-button exhibits from those which allowed one to 'get involved'. The distinction he made referred to different levels of interactivity which seems to be defined according to the degree of involvement the exhibit allowed. In addition, there was a feeling that the activities were similar to those carried out by archaeologists. Hence, he thought that in the case of the ARC, the exhibits allowed him to '*really* get involved'.

Only one child mentioned that she wanted to visit the Museum because she expected to be able to touch.

(b) Adult visitors in family groups As was the case with the adult family members at the MSI, there was a large number of adults whose expectations were subject-specific. Some adults (in 25 groups) at the ARC referred explicitly to their expectations. The rest mentioned that they did not know what to expect. Very often they referred to what they expected their children to gain from the experience.

Adults in fifteen family groups mentioned that they wanted to learn more about archaeology and how archaeologists work. Their agenda was very much subject-specific as opposed to the agenda of many of the child family members which was object-specific. Adults expectations were affected by the fact that they chose to visit an archaeology museum. In all cases, the adult family members had a particular interest in archaeology

and/or history[17]. Five of them linked their expectations with their hobbies, archaeology courses or their occupation[18]. The following quotes are typical examples of this point:

W: I've done my history degree and I am a teacher now, I teach Romans so it just reinforces it (...) picking up any more tips, you know {laughter}. (F20, Q5)

W: Ehm, just to learn a little bit more about the (...) the history of York and the Vikings and find out (...) you know, I didn't want a complete history lesson but I wanted to pick up information and I think we both find the idea of archaeology quite interesting. P.'s always taken an interest and has never really been involved in any, in anything to do with archaeology. (F3, Q5)

The adults in three of the above groups referred specifically to field archaeology and expected to find out more about more about a dig or the finds. Here is a typical example:

M: I thought they might be digging in the basement or something but I had a vague idea that maybe a dig was going on. (F4, Q5)

On the other hand, there was one family group where the adult admitted that she did not have a special interest in archaeology. However, she thought that it was important for her 5 year old daughter[19] to visit museums and seemed to be more comfortable with the interpretative approach the ARC adopted:

W: Ehm, I don't know. I just heard that it would bring the past alive a bit (...) you know, make things more real. (F26, Q5)

Only four adult family members (in 4 families) seemed to expect to find particular exhibits in the ARC. Although they all were first-time visitors, they mentioned that their expectations were influenced by previous visits to archaeological museums or sites and by things they were told or read about the ARC.

Adults in nine family groups expressed their surprise because the ARC was so different from what they expected. Comments were focused on the hands-on aspect of the exhibition and the fact that it encouraged visitors to take part:

M: I expected it to be more (...) exhibits rather than this. (F15, Q3)

M: Well, I think probably I expected to just look at the things, not to experience them.

[17]Most of the museum visitors interviewed by Merriman (1991) also mentioned that they were interested in the individual museum they chose to visit.

[18]There was an archaeologist and a history teacher in secondary education.

[19]The age of the children and an interest in bringing children under the age of 12 to a museum was also reported by Hood (1989:158-160) in the Indianapolis study.

{I: didn't you know that you could touch?}
W: No.
M: That's the interesting part of it.
W: It's better than just reading things on the board and looking at things. (F30, Q3)

M: Yeah, I think we're interested in history of the, especially the Viking history and I expected it to be hands-on because our friends told us it was but I don't know, you know, (...) you know, I thought, I sort of expected to look through things and try to sort out but it's actually a lot more than I thought it would be, more things to do than I thought there would be.
W: It's more direct.
M: Yes. I didn't really think about getting here to make shoes and making the weaving and the writing and that sort of thing. (F8, Q5)

As was seen in the section on children's expectations, adults also did not expect to be able to touch. Even when they knew it was a hands-on museum they did not expect to be able to get involved to that extent. This does not of course come as a surprise since most of the adults were brought up with traditional museums. Even nowadays it is still much more common to find science museums or science centres providing hands-on exhibits than archaeological museums. In fact, the ARC was the first archaeology museum in the UK where all visitors could touch fragments or whole pieces of artifacts.

The quotes above also reveal the image adult family visitors had of an archaeology museum. According to the two first people (F15, Q3 and F30, Q3), the activities in the ARC are not the typical exhibits one expects to find in archaeology museums.

One adult said that she did not expect to be allowed to touch real fragments such as pottery and leather. The adults in another two family groups expressed their expectations in more general terms. They wanted it to be an enjoyable experience for all family members. One of them was a grandparent who had only visited the ARC because her daughter and granddaughter wanted to as part of their visit to York.

Factors influencing the personal agenda One of the things which came out of the discussion about the personal context of the visit and about the way the family groups planned their visit to the ARC was the role previous museum experience played. This was also noted in the two previous case studies. However, in this case, it is more evident since many families (21 groups) had not visited the ARC before. Yet, they were frequent museum visitors with a special interest in the subject of the exhibition. They, thus, perceived museums as an environment where they felt comfortable and they were familiar with the museum code.

Once again expectations were defined and refined according to many factors and influences. Previous museum experience and an interest in the subject were two of those

factors. Second-hand information (information provided by friends or written material such as leaflets, guide books and posters) about the Museum and its collection was another source of influence. Almost one-third of the family groups referred to the fact that their expectations were affected by a television programme they had been watching and also by a recent visit to the Jorvik Viking Centre. Both of them served as a point of reference for these family groups in determining their personal expectations. In one case, a 9 year old boy said that his expectations were aroused by the introductory video he watched at the ARC. Another family member mentioned that she expected to find volunteers who would help visitors when needed. None of them mentioned that they knew that a part of the visit was already structured by the Museum. Even when they reconstructed their visit, family members presented their movements as being their own choice.

7.4.2 The social context

As was mentioned above, family members were concerned with their Museum experience. Yet, adult family members were equally concerned with the educational experience of the children in their groups. Although having children was an incentive for the adults to visit the ARC, a lot of them were interested in the subject themselves.

On the other hand, the child family members were concerned only with their own experience. The vast majority of the children referred to things they expected to be able to see or do. Only one child seemed concerned with her educational experience[20].

Children's social agenda In six cases, the children wished to visit the ARC as they had been before or had heard about the Museum and therefore persuaded their family to visit. Three of these families where on holiday or on a day trip to York. The adult family members in all three groups said that it was entirely the children's decision. In another family, who were living locally, the children were asked by their parents to decide where they would like to take their grandmother who was visiting them.

One of the children who had visited the ARC before shared her experience with her brother. She described to him her favourite exhibits in a lot of detail and they both made plans about seeing the environmental section together on their next visit. This social interaction seemed to have influenced this boy's expectations about the visit as well.

One child family member wished to visit the Museum shop which he did not seem to distinguish from the visit to the exhibition itself:

B: I'd like to go back to see the first section and go to the shop.
W: {laughter} The shop is very important.
M: Yes {laughter}. (F10, Q4)

[20]Refer to quote F16, Q4 in page 202.

Adults' social agenda Adult family members in seventeen groups wanted to influence their children's educational experience. However, adults in a further eight groups referred to the experience as enriching for both adults and children. For the visitors from abroad, the exhibition presented a part of English history while for British visitors it was part of their history (social aspect of archaeology). Here are some typical examples:

> M: For me, I found it interesting and for them as well. It's part of history, I mean, they're both interested in things to do with old things and bones and things like that. (F17, Q5)

> W: Oh, I think every place we visit in England we want to understand a little bit more of the history because there's so much history here, you know, and coming to the ARC really, ehm, (..) sets up some different ages very clearly. (F8, Q5)

Two of the grandparents in family groups talked about the importance of the family aspect of the experience. They mentioned that they visited because the rest of the group wanted to and that they did not take an active part in the activities. One of them had visited York in order to be with her daughter and granddaughter and was not really concerned with the planning of the visit. The visit to the ARC was her granddaughter's choice and she just followed. The other one found it difficult to see the exhibition properly because of the short attention span of her grandchildren. However, she did not really mind because her priority was to be with her grandchildren and to enjoy their company. She mainly referred to what her grandchildren could gain from the visit. On the whole, there was a much smaller number of grandparents (only 3) as compared to the previous case studies. Two of them came with the parents of the children they accompanied while the other one brought her grandson to see the Museum.

Enculturation The parents in seventeen families specifically referred to how they could use the resources in the ARC to influence the way their children think. The terms some of them used were quite suggestive. They wanted 'to make them aware', 'to give them or to encourage an interest' or 'to build up on an interest which is already there'. Hence, these adults wanted to introduce their children to archaeology and the work of archaeologists:

> M: As I said, when he is enthusiastic about something I like to keep that going, build on the enthusiasm. (F1, Q5)

> W: To find out a bit more about archaeology and to make them a bit more aware of their surroundings than they already are. (F15, Q5)

> M: Well, I knew I would enjoy it because I'm a bit interested in that but I was hoping that I would encourage an interest in her as well. She's already got an interest, though, I think already. I knew she'd enjoy it. I knew she'd like to touch things. I think she has enjoyed it, haven't you? (F27, Q5)

The vast majority of these adults referred to their children's deep interest in archaeology or history. Another adult said that her son had been to the ARC with school and had talked about it very enthusiasticly. They therefore decided to visit as a family in order to give him a chance to see the exhibition when it was less busy.

Five adults thought that it was important for their children to be able to feel and explore real artifacts:

> M: For my daughter an awareness more than anything else; just to see (...) so she can pick those things she's seen on television about Romans. (F13, Q5)

> M: I thought it would be good for the children to see them first-hand, actually pick up things from the past and touch them. (F14, Q3)

Finally, one adult, who had volunteered on many digs, saw the visit as a way to show her children what she had been doing. It seemed to be important to her as she had decided to go back to full-time education as a mature student and do a history degree. It was obviously something the family had discussed in the past on different occasions like when they had been watching the Time Team programme on the TV:

> W: I just thought it's good for them to see things like that especially because they've been watching the Time Team and it's just, (...) they've been really interested in it and, yes, they knew mum was doing that. (F4, Q5)

The first section of this chapter discussed the way family groups viewed their visit to the ARC. This refers to their motivation for visiting, the personal and social context of the visit and the planning of the visit itself (visit route and practical issues concerning the visit). These factors, together with the profile of the families, influence the agenda of the groups. Their agenda is also influenced by the way the museum is perceived. This includes visitors' perception of the exhibition, its theme, the physical characteristic of the place and the communication approach. These latter issues will be discussed in more detail in the following section.

7.5 The exhibition

Family groups come to the ARC for various reasons, bringing with them ways of seeing the visit and a series of expectations both personal and social. Visitors' preconceptions and expectations about what the visit will hold influence the way the visit is perceived and the messages they take away with them. The Museum environment also provides a social setting for the family visit and plays an important role in the formation of the family agenda. The physical characteristics of the Museum, the presentation and communication media of the exhibition, and its subject matter affects the way it is perceived and

reconstructed by family members. The next section discusses how these factors relate to each other during the visit.

7.5.1 Families in the ARC

On entering the ARC the family groups were greeted by a volunteer who explained to them how the visit is structured. The vast majority of the families watched the audio-visual presentation (10 minutes long). Only a couple of groups had to move on, due to crowded conditions in the projection area, and watched it at the end of the visit. They followed an explainer in the Finds Handling area where the vast majority of the family groups were told how to distinguish fragments of objects according to their material at the finds sorting activity. They would then follow an explainer to either the bones or the pottery activity. Only in the case of four family groups, did family members separate into smaller subgroups or did these activities on an individual basis (see also appendix C.). Slightly less than two-thirds of the families stayed together throughout the visit or separated only for a few seconds. The rest did separate activities after completing the finds sorting. However, they normally separated in the Experimental Archaeology area where many demonstrations were taking place at the same time. Moreover, by that time adult family members had made sure that there were enough volunteers around if the child family members needed help. Family groups with quite young children (4-8 years old) tended to stay together or form subgroups of adult-child dyads. This type of stick-together behaviour was also common among families consisting of one adult and one child regardless of the latter's age.

The presence of the volunteers affected the amount of social interaction that took place among the family members, and between them and the volunteers as compared to the previous case studies. This was much more evident in the Finds Handling area: family members watched and listened to the volunteers explaining the activities; and they asked the volunteers questions and talked to them about the exhibits. Looking at the big artifacts that volunteers took from the shelves provoked verbal interaction between the family members and the volunteers. It also generated gestural interaction as family members, especially the children, were encouraged both by the volunteer and adults to touch the objects. Family members asked the volunteers questions about the artifacts. Here are some typical verbal exchanged: 'What's this?', 'what did they use that for?', 'is it a piece of pottery?', 'we've done it!', 'brilliant!', 'thank you very much. It was fascinating!'.

There were many opportunities for social interaction between the family members while they tried the activities (which required co-operation), or after completing them. Both adults and children handled artifacts or reproductions of objects, looked at them while other family members used them and read labels aloud or quietly. At some exhibits – such as the sieving, the padlocks, the different writing technologies and the computers –

the family members shared different types of interaction: adults read the labels aloud and pointed at different parts of the exhibit while the children tried to work it and listened to the comments; adults holded the lock while the child unlocked it by trying different keys. In seventeen family groups verbal interaction in front of an exhibit was combined with affective behaviour[21]. Only in five families were family members observed showing aggressive behaviour. In most cases, it involved children competing with each other over use of an exhibit. Only in a couple of cases, minor aggressive reactions were observed where adults tried to make children see an exhibit, stay longer or move on to the next one. Some, usually the adults (in 6 family groups), were happy to watch others (children mainly) touch and work the activities. At the Experimental Archaeology area and the Computer Interpretation where volunteers let visitors interact on their own, the adults did try to show, explain, or help the children in their groups. The following quotes are typical verbal interaction between family members: (a child calls an adult to see what he's found) 'This is a bone (...) oh, another one!', 'Look at this here!'; (an adult provides a reward) 'You did it, you see?'; (question-asking was common among adults) 'What's in it?', 'Where do you think it goes?', 'Are you finding anything?'; (children also asked adults questions) 'Mummy, what is this?'; (using familiar concepts to describe the exhibits to a child) 'Next there's an alphabet'; (waiting for others to finish and taking turns) 'Shall I do it?'; (sharing information between the family) 'You've got to read that!'; (a child invites the parent to do an activity) 'Let's go to this one', 'Come to write your age', 'I've done that, I'll show you'.

Occasionally the family groups watched other ARC visitors interacting with an exhibit or a volunteer. This behaviour was exhibited by 23 families (both adults and children). Only in eight of them did an adult or child family member speak to another visitor. A few families took pictures or filmed members in their family while interacting with exhibits. The vast majority of the family groups seemed to look at the first floor, the stairs or features of the building quite often towards the end of their visit and especially when other family members were using the computers. This behaviour often signalled that they were ready to depart.

Time spent in the exhibition The average time spent in the exhibition was 60 minutes with a maximum of 2 hours and 10 minutes and a minimum of 35 minutes[22] (table 7.9). Nineteen families spent from 35 to 60 minutes, eight families spent more than 60 minutes and less than 90 minutes while only two families spent more than 90 minutes.

Thus, the family groups spent quite some time in the exhibition interacting or looking at the vast majority of the exhibits quite carefully, interacting with each other and with the volunteers, reading material and taking care of each other.

[21] An adult points at the exhibit and explains while embracing the child.

[22] Excluding the time spent to watch the introductory video (approximately 10 minutes).

minutes	number of family groups
35-60	19
60-90	8
>90	2

Table 7.9

Time spent in the exhibition.

7.5.2 How was the exhibition perceived?

A remarkably large number of family members expressed their preference for specific types of exhibits during the interview. They were shown pictures of the exhibits they had used during their visit and were asked questions about their experience. They were asked to remember which exhibits they had used and to pick the one they liked or remembered the best. This initiated a lot of discussion and comments among family members which covered different aspects of their experience.

The children in all 29 groups specified which were their favourite exhibits. In many cases, they mentioned more than one. The two most appealing exhibits seemed to be in the Finds Handling area (figure A.23). These were the sieving and the finds sorting (14 children chose the sieving and 11 the finds sorting). The third most popular exhibit was the padlocks (chosen by 9 children) which is located in the Experimental Archaeology area. The rest of the exhibits were picked by only a small number of children. Only five children chose the computer exhibits as their favourite ones.

The adult family members who specified which exhibits they liked seemed to have quite similar preferences to those of the children. In total, adult family members in 24 groups referred to specific exhibits. The Finds Handling and the Experimental Archaeology areas[23] were the ones mentioned most often. The sieving and the pottery were the most popular exhibits among the adults followed by padlocks[24]. Five adult family members in four groups could not choose a particular exhibit out of the ones they had visited. They said that they liked all of them equally. Two of them said they could not distinguish them since they all had the same objective, to make visitors look carefully and try to imagine what it could have been like:

> W: Well, the whole thing is like one thing leads to the other. I can't really say which one was my favourite. Like A., I liked sorting the pottery because it wasn't obvious at first which piece came from which article, just identifying small pieces and having to look fairly closely at it in order to see it. It's very easy to look carelessly at something like that. And I think, all the way through including the locks, it was very easy not to

[23]These were actually the most popular areas among the ARC visitors who took part in the exit survey (ARC, 1996).

[24]Nine adult family members referred to each of the first two exhibits and five to the third one.

look closely, you know. It's observation as much as anything, leads you to the answer of the problem. And I think some times we tend to look at things very superficially. I do anyway {laughter}. (F7, Q9)

In addition, the adults in three groups could not pick any of the exhibits as either they did not see them properly or did not see them at all. Two of these families consisted of parents visiting with their young children who had short concentration spans. They found it impossible to follow their children's pace and see the exhibits properly at the same time. The other family group consisted of a grandparent who was visiting with her grandson. She mentioned that she was too tired to follow him around the Museum. Instead, she waited for him and had actually not seen any of the exhibits.

Family members in six groups commented on the 'doing' aspect of the exhibition which they found a very interesting and direct way of learning for both adults and children. One of them mentioned that this was a good way for family groups to learn together and for novices to be introduced to the basic concepts of archaeology. Here are some explicit examples:

W: I think actually you know a lot more because you have to do it yourself, which one is the pottery, which is the bone, so you learn more about it. (F15, Q9)

W: I think it's designed for children and adults as well. I mean, you know, I'm not, you know, fond of archaeology as such. I'm still learning myself, there's an awful lot to learn, isn't it? I think it's a good learning experience for children and adults and it's done in a simplified manner so that you can learn along with the children. I think that's very good. (F9, Q3)

Unlike the family groups at Eureka!, both the child and adult family members were in favour of almost the same exhibits. The exhibits in the Finds Handling area and the padlocks in the Experimental Archaeology area had the same common elements. They all posed a problem which was solved by following specific steps and by using the resources available. One of those resources was the help of the volunteers. For the rest of the exhibits, the most common form of interpretation was a demonstration where visitors were invited to assist the volunteer. The computer exhibits were not supported by the volunteers. Hence, as the visit proceeded family visitors had gradually less opportunities for social interaction with the volunteers. This is quite important as volunteers seemed to have played an important role in the family Museum experience as will be discussed below.

7.5.3 Social interaction

As was the case in the two previous museums, this part of the interview stimulated a lot of verbal interaction between the family members. The pictures encouraged discussion

amongst the family members about what they did with the exhibits and, occasionally, they exchanged ideas about them. The most common type of behaviour noted was the tendency to identify the exhibits and state which one each family member liked. On a few occasions, family members tried to guess which exhibit the rest of the family liked based on their observations during the visit. Their judgement was usually based on the time spent on an exhibit or return visits to it.

Adult family members (all parents) in three groups tried to use the pictures to remind their children of the exhibits and information related to them. As was seen in the previous museums and especially in the MSI, adults asked children a series of questions about the exhibits. This technique of question-asking together with positive reinforcement seemed to be the most popular 'teaching method' (when such a method was used) among adult family members in all three museums. Here is a typical example of this point:

W: What did you have to do with the man when we came in. How many groups did we get for our bags?
G: Three.
W: Do you remember what any of them were?
G: Pottery, bones, (...) brick. I liked that one too {points at sieving}
W: Looking through the microscope. (F26, Q7-8)

There is also indication that prompting was used during the visit by the adults to help their children work the exhibits or to find the solution without them telling what it is:

G: I did my name there {refers to the Roman numbers}, oh, not my name. I wrote how old I am. I'm seven.
M: That's right. What I basically said 'these are the numbers, these are the Roman numbers' and I just said 'write your age'. And then she asked 'what's twenty?' and then I said 'think about it'. (F13, Q9)

This girl made a drawing of this exhibit (figure 7.1) which shows what she did as a result of the social interaction with her father. The drawing includes the Roman numbers and their equivalent contemporary number, her age and the number 'twenty'.

The man in the above example referred to the visit as a way of reinforcing family ties and having shared experiences with his daughter to which they can both relate in the future:

M: But also the realisation of going back to the time of the Vikings and the type of things they used. I've never appreciated it. And see all the bones and things from them and you can pick up all these things. So when we get together and we see things we can then relate to it, back to what we did today. It's maybe not the exhibits today but in two, three, four, five, ten weeks time, we can relate back to what we've seen here and she'll remember it. (F13, Q9)

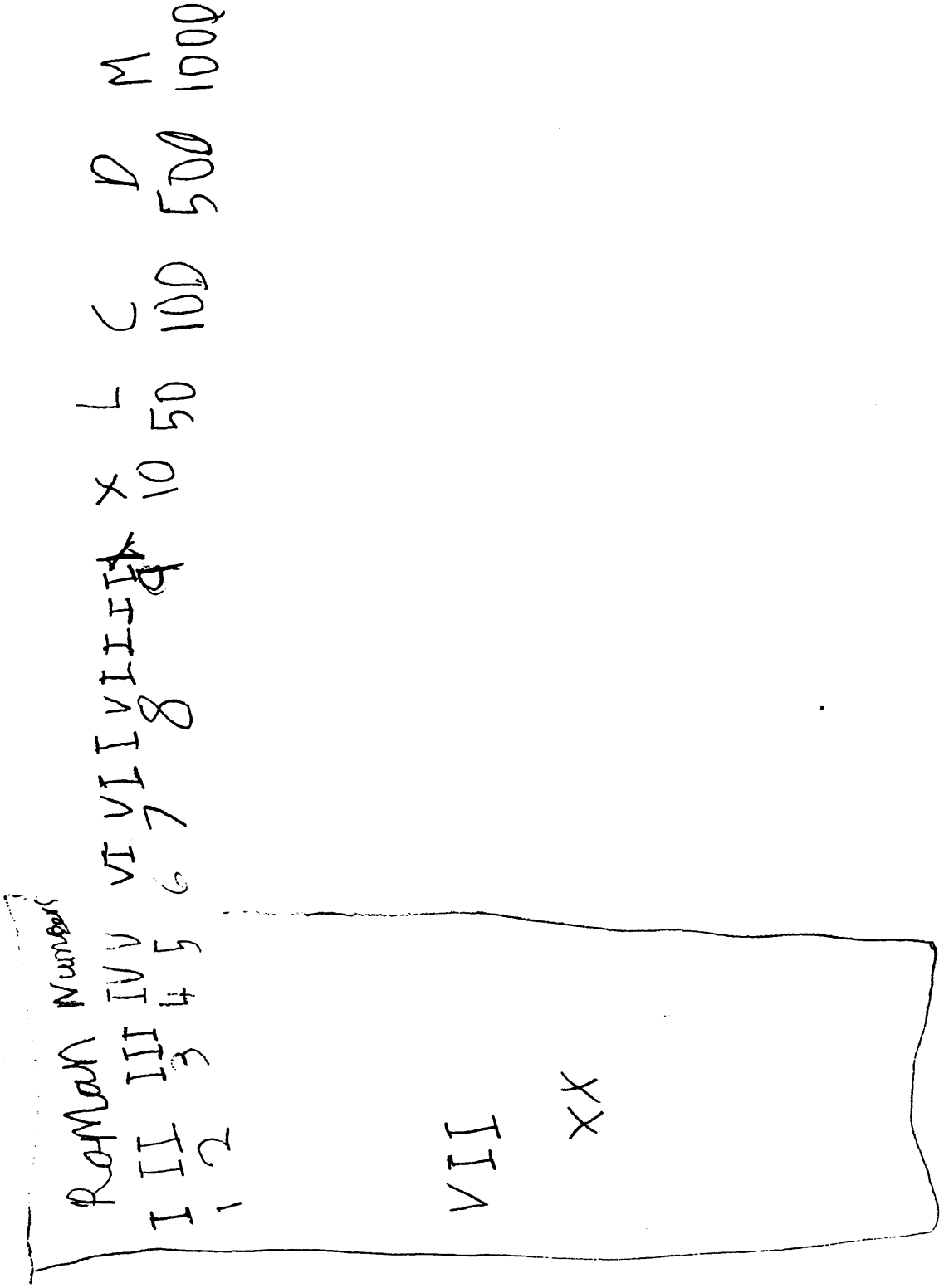


Figure 7.1. *Drawing of the Roman numbers (girl, age 7).*

In four more family groups, family members commented on what they were thinking while they or another family member interacted with an exhibit. The following extracts

are typical examples of this point:

B: When we came here with school trip me and J. tried to get to unlock but we couldn't get it open. We only managed to unlock one of them.
{I: what do you think it tried to get you to think about?}
M: He just wanted to know what was inside it, didn' you?
B: Yes, 'cause I know that one of the keys would open it, I knew that but I couldn't open it. Well, first of all I put the key the wrong way round but then I realised that I just needed to shake the key, push it.
W: You would do that in a normal lock. (F10, Q9)

M: Well, I enjoyed working with M. {his son} on that one {refers to sieving}. It was interesting to see if he could recognise the match and helping him to get it right that sort of thing. After a while he//
B: //What I thought he did was finding bones and sorting them out for me {laughter}.
M: He's quite a fast learner. He learns very quickly picking the bones. (F22, Q9)

The first quote summarises the actions and thoughts of this 8 year old boy in his effort to unlock the Padlocks. He also related this to his previous experience when he had visited with school and saw why he could not open one of the locks then. The latter extract is an example of how a parent tried to help his son to work the exhibit but also to make the task easier for him. The exercise also made him realise how his son learns in a social environment.

7.5.4 How was the exhibition read?

The exhibition space in the ARC is divided with boards into four smaller spaces which are quite open (figure A.23). The exhibition is organised thematically reflecting the tasks performed by different archaeology researchers. This organisation is not signalled in any way. It is, however, communicated to visitors by the volunteers on entering the exhibition area and during the visit. Hence, the volunteers play a crucial role in the interpretation of the exhibits and the activities. Although social interaction between the visitors and the volunteers is the main form of interpretation, there are some panels and diagrams which assist the interpretation of the activities. As the visit proceeds, visitors are encouraged to do the activities with little help from the volunteers and the visit becomes less and less structured[25]. Thus, there is small margin of choice in the first three areas of the exhibition. Indeed, there was little variation in the kind of choices the family visitors made during their visit.

[25]In the Computer Interpretation area, for example, there are no volunteers but visitors can ask for help if they face problems with the exhibits.

The vast majority of the family members could associate the exhibits or the activities with the themes they belonged to. Their answers covered at least part of the objectives set by the exhibition team. In many occasions, family visitors' remarks went beyond the actual objects and the people who made them, commenting about the work of archaeologists and how the past is reconstructed.

Reconstruction of the visit There were two main ways in which family members reconstructed their visit: the history and the object study. There were differences in the way the child and the adult family members expressed their accounts of the visit.

(a) The history Family members in 16 groups referred to the visit in terms of understanding the crafts and technologies of the past and how they were used. This was done in two ways. Either they commented on the things people used/made/did or they compared modern practices with past ones[26]. However, in both cases the family members used contemporary terms and concepts to describe their ideas. Their perception of this history theme was influenced by the capacity of some artifacts or replicas of objects to provoke admiration or appreciation of the crafts and technologies of the past. The family members in twelve out of the sixteen groups mentioned that they had an interest in archaeology or history. One adult had a professional interest (he was a valuer and auctioneer).

Four adult and four child family members (from the age range 8-13) referred to exhibits as evidence of the life in the past by describing the things people made and used:

> G: How they did it, how the Vikings did it {refers to the weaving}. (F25, Q9)

> M: If you see the decorative, the actual decorative at the pottery, I mean, there were some fine pieces there. So that's two things that I liked, how things were done and I was fascinated really how they did them. (F13, Q9)

> G3: We opened it {the padlocks} and then there was something inside. When someone died they would put them {objects} in the chest. There was a bone of something. (F7, Q9)

The last extract is an example of how this 9 year old girl related previous knowledge of death customs with her new experience of opening a Viking chest. The association with death customs was a way to explain why pottery was kept in the chest. Perhaps it was the nature of the objects and the size of the chest which led this girl to link this exhibit to that particular idea.

Another nine adult and three child family members from the age range 11-14 (in 9 groups) directly contrasted the objects used or the practices employed in the past with

[26]Similar ideas were reported by Merriman's (1991). He identified two groups of people according to why they thought it is important to study the past: the 'present-oriented' (the past guides people in the present) and the 'past-oriented' (interest in life in the past).

those of the present. As a result, family members often expressed their appreciation of the amount of time and effort needed to perform certain activities in the past. This comparison involved an evaluation of both examples, that is a value judgement, which led to an assessment of the pros and cons of each case. Here are some typical examples:

M: {refers to the loom} The different, well, not that different process from how lots of looms work but this seemed more//
W: //Very labour intensive {laughter}.
M: Yeah, but more on an individual basis rather than an organised one.
W: Yes, personal.
M: Yeah, very personal and you have an object much nicer than the sort of (...) mass produced ones. Machines that are doing mass production are (?) this is quite sculpture really.
W: It's nice, yeah.
M: It's personal; it was people doing things for themselves (...).
M: The design of the key and the locks themselves have changed quite a lot. The padlocks are quite similar to those Chinese ones.
W: Some things change a lot//
M: //Some things change a lot, some don't.
W: And then some elements don't change very much. (F10, Q9)

B: Well, really how they had to cope. They couldn't just go down to the shop and buy a new pair of Doc Martens or something like that. You had to make your own shoes and, well, I found out that it was quite hard, ehm (...). (F9, Q9)

M: I liked the weaving. I think that even if you're doing it a lot, and more than the poor young man was {refers to the volunteer}, it must take hours to get a cloth out of that and then obviously if you're doing that every day you're going through the stages much more rapidly than we did but even so the actual technology that they had was so clumsy and also it made//
W: //Can you imagine the amount of time it would take them and the effort?
M: Yes, and noting and renoting all these stones. (F16, Q9)

The 'hardness of life in the past' and the 'lack of modern amenities' mentioned in some of the above extracts were the two most frequent categories identified by Merriman (1991) as people's images of life in the past. This reading of the exhibition focuses on the historical dimension which, according to Brisbane and Wood (1996), can be one aspect of archaeological research.

(b) Object study The other reading of the Museum exhibits related to the study of the objects through the activities and the knowledge or information gathered as a result. A number of family members – mainly children – referred to the skills involved in studying

artifacts as they were applied in order to carry out the activity or the task. Others referred to those skills as a tool for studying and interpreting material evidence. Family members in eighteen groups accounted for their visit in the above ways. The family members in twelve of these groups had a special interest in archaeology and/or history before they visited the ARC. In two of these cases, the adults had a professional interest (was one archaeologist and one a history teacher).

Thirteen child (from the age range 5-10) and three adult family members reconstructed their experience with some exhibits in terms of what the task and the skills involved were. This included identifying different materials and their properties, comparing and putting things in categories and observation skills. The focus was on the task and the family members' ability to complete it. The following quotes are typical examples of this point:

W: I liked the pottery one. It just showed the variations in the types of pottery, how different is one type from another type.
B1: Yeah, that was like solving a puzzle.
W: Yeah. (F8, Q9)

B: Well, on one of them {refers to the padlocks}, my dad was working on, it was really weird 'cause, if you've got the key, the right key, you have to push it like that, this way up deep in the corner and pull it up and pull like pull the key. That one was quite tough to get it.
W: It changed the coordination, the two movements together so it's quite hard to do. You did quite well on that on, didn't you?
B: Yeah, and then I did it again and I got the right key straight away.
W: Yeah. I think he did it again just to prove that he could do it {laughter}. (F22, Q9)

A large number of family visitors went beyond the acquisition or exercise of skills. They referred to the role of the activities in helping them appreciate the artifacts or exhibits as part of their culture and the role of archaeologists in studying and interpreting material evidence. This latter type of reconstruction of the exhibits was much more common among the adult family members (12 adults) than the child family members[27] (only two 10 and 11 year old children). Here are some typical examples:

G1: I liked the one with the magnifying glass and the trays where you had to sort the finds.
{I: what do you think it tried to show you?}
G1: It tried to show you that the bits were, like before they all get it and looked at and shows what they were digging up. (F7, Q9)

[27] A total of eleven family groups.

W: I think it showed just how much, ehm, pain (?) in taking care is involved in archaeology. I mean, it's (...) people have to spend an awful lot of time just to go through things. It's not, it's not exciting findings all the time but it's just slow compensation and, I mean, I find it fascinating. I'd enjoy just sitting and doing that for hours and hours, you know, in the middle of all this hard work. I find that fascinating. You enjoyed that too, didn't you?
B: Yeah. (F3, Q9)

M: What I gained from it was the idea of looking at the fragment {refers to the pottery} and try to relate it to what the finished thing might have been and what surface finished might have been on it, whether it's heavy or light and fine. I've found that was very interesting.
W: Yes, I've liked that one very much. It was interesting looking at the whole thing from just a tiny piece, where it would have gone on that pot, some of them were the bottom, some were the handle. (F1, Q9)

Many of the reconstructions involved playing the role of an archaeologist. It was also implied that a knowledge of the past helps people gain a better understanding of themselves.

Reconstructing the social agenda As was the case in the previous museums, personalisation of the information contained in the exhibits or the audio-visual presentation was an important aspect of the reconstruction of the visit by a number of family groups. Almost half of the families made links with their previous experience. This included general knowledge, information acquired from other sources (such as the Time Team TV programme, or visits to similar museums) and hobbies (such as digging in the garden or the river banks):

M: We've seen on the video in the dig how far down they actually found these things, I mean ten metres. That's too deep. In the Time Team they dug down to a few feet, didn't they? (F13, Q4)

G: Well, I remember {points at the sieving} (...) because you can find things that you can probably find in your garden but you just think that they're just pieces of stones or some things but you like it. (F20, Q9)

W: I liked the sorting box, (...) that what appears to be a jungle of things can tell you so much and that, even if you're new to it, you already know so many things to start off and then you begin to work it out for yourself. (F14, Q9)

The information provided by the volunteers and also by some of the exhibit panels played an important role in making it personal for the family members. This was particularly evident in the case of five family groups who reconstructed pieces of information

which only the volunteers could have given to them. The role of the volunteers in the ARC was an important aspect of the social experience of the family group (see also page 228). The following are typical examples of this point:

> W: Oh, there was an elephant bone there and they were actually living in this country, you know, during the warmer ages before the Ice Age, but it was interesting that they were probably very similar to the elephants of today. You know, it just amazes me that animals had evolved millions of years ago to the stage where they almost are now really, you know, long before the man was even thought of. That concept is really difficult to grasp. But, yes, they {refers to the volunteers} were all very helpful and interesting.
> {I: do you think that seeing the bone helped you understand it better?}
> W: Yes, it makes it fall into place a bit more. (F3, Q11)

> W: And there's another one where that man had the animal skulls and he was explaining what happened to the animal head. (F15, Q9)

As was discussed above, the adult family members in seventeen groups were concerned with influencing their children's educational experience during the visit. There is evidence that the children in four of these groups were also concerned with the social aspect of the visit. They tried to guide the adults through the exhibition, show them how to work an activity or explain it to them. The following quote is a particularly explicit example:

> W: She was telling me what to do. She thinks she understands it better than I. That's usually the way it goes.
> {I: have you done similar things before?}
> G: Oh, yeah, 'cause we have to match things at school as well. (F27, Q12)

Furthermore, 21 family groups mentioned that they decided to visit for the children or because the children wanted to[28].

Family visitors were specifically asked to make links between the exhibits in the ARC and previous experience or knowledge. The great majority of the families who gave answers[29] were able to relate some of the exhibits to similar things they had seen in other museums or sites; to things they used in their everyday life (at home, at school); and to hobbies.

[28] As mentioned above, the child family members in six groups had visited before and wanted to go back with their family.

[29] Forty-three family members in 23 groups were able to make connections; seven family members in five groups could not relate them to anything in particular; and the members of another three family groups did not answer.

Affective experience Six family members (in 6 groups) referred to how some of the exhibits made them feel and how they responded to them. In all cases, this type of emotional response was positive. It either involved the idea of being able to touch and feel the artifacts or the thoughts, images and feelings that they provoked:

> M: I enjoyed looking at the pottery. I just liked the (...) just the feeling of having found interesting things that have been buried for so long, layers upon layers of history. I liked all of it because it's all related really. I'm more interested in actually seeing the pieces of pottery and bone and things, and imagine where these things are from rather than trying to recreate things as they were. That doesn't appeal to me so much making things look similar to the way they would have been. (F7, Q9)

One woman said that her experience with shoe-making had a therapeutic effect on her:

> W: We certainly could have stayed quite a bit. We liked it; the sort of sewing and the feel of the leather, you know. I think it's a nice, I mean, A. likes to do things like that anyway//
> B: //Yeah.
> W: //He enjoys making things and I like doing practical things so it was quite therapeutic if you'd imagine you were sitting there and it was a group of you sewing with the smell of the leather and sewing and the whole feel of it, I think, it was pleasing//
> B: //Yeah
> W: I think it was very pleasing.
> B: I enjoyed that.
> {I: was it your favourite exhibit?}
> W: No, I don't think I have a, I wouldn't say that anything was a favourite to me, ehm, I think they were all, ehm, I don't know. I think they had all some appeal, you know they were all, I mean, I did like them all and, I mean, I could stay there longer doing the shoe because I wanted to finish it, you know. You can actually see the end product and you try to finish it so that you can see something made and that's probably quite satisfying 'cause, you know, apart from letting you cut the leather around which obviously we didn't do, ehm, I suppose that was quite satisfying. But it all had an interest, it all, (...) we haven't actually been to the computer section but that's not something that I lean towards anyway. I always find that more, you know, more (...) (F9, Q9)

In all of the above cases, such affective response was related to the nature of the activity or to the level of involvement it entailed, and the fact that it involved real artifacts.

7.5.5 Ideas about archaeology and history

As was mentioned above, family groups were asked to try to relate some of the exhibits to their previous experience. The most common examples were taken from everyday things family visitors used at home or at school. They also mentioned that they had seen similar exhibits in other museums or that they were interested in digging in the soil to find objects. Visitors were then asked whether their visit(s) to the ARC helped them change the way they saw archaeology. Their responses revealed their notions about archaeology and also about history. Some family members referred to the different connotations that 'archaeology' and 'history' have in everyday life. Another issue discussed was how they used the ARC or visits to similar museums and sites to follow up an interest which in a large number of cases (22 family groups) already existed. Indeed, family members in more than-two thirds of the families were archaeology or history enthusiasts[30]. Note that this is unlike Xperiment! and Eureka! where a special interest in the subject matter of the exhibitions was observed in only a small number of families.

Both child and adult family members in thirteen groups gave examples of ARC artifacts which reminded them of objects they used in their everyday life. They seemed to think that there is a continuity in culture through the objects people used in the past and those they use nowadays. They referred to objects they used at home and at school and also to material used for the same purpose in the past and the present:

> W: I thought the shoes were similar. Shoes haven't change much at all, you know, really the way they made them and the way they look. (F5, Q10)

> B1: The big pottery pots, we've got lots at home. I keep coins and pins and stuff like that in them. (F8, Q10)

Family members in nine groups (mainly children) were able to relate to the process of digging things up as they themselves had done this.

As was discussed above, 22 family groups decided to visit the ARC because they were particularly interested in archaeology or history. Thus, they were highly motivated people who had been doing various activities related to their interest. This included museum visiting, taking courses, forming collections, watching television programmes and going on excavations. In six of these families, an adult family member had a professional interest in archaeology or history. However, they found their experience in the ARC to be interesting and they learned new or interesting things. This was also true for the vast majority of the family members. Family visitors in nineteen groups particularly commented on the acquisition of knowledge and a method of work (working methodically, and enquiring and looking closer at things), and on the communicative approach of the exhibition. The following quotes are typical examples of the above point:

[30]There is a strong indication about this in the testimony of the volunteers. Merriman (1991) found that participation in history and archaeology societies was related to education rather than age.

G: Well, I wouldn't pick history or anything to do with history but I saw many useful things in case I want to use them. (F20, Q13)

W: The most interesting thing for me because you walk along the beach and you come across all these things and you think they're all stone but when you actually know what you're looking for there's an awful lot more than you realise. It makes you more aware. Next time you walk along the beach you look closer. (F30, Q9)

W: But you know how it's done. I've always loved history and archaeology very much, yeah, but in no other museum that I've ever seen could you have a go, and you saw the results of the archaeologists' work. Here you're involved. It's very much hands-on. (F21, Q13)

The fact that visitors were invited to get involved and to perform the task of an archaeologist with artifacts made the whole experience quite realistic. It also made family members more aware of the subject and the people involved in it. Family members mentioned that they were trying to guess how old the artifacts were or to imagine what an object would have looked liked from the fragment. They got a feeling of what life was like in the past and how archaeologists reconstruct the past from the material evidence. Occasionally, they used the terms 'awareness' or 'appreciation' to express they kind of experience they had. Here are some typical examples:

G1: It's more fun because you can feel everything.
G2: Well, I think the same thing, ehm, and you can actually see what it's made of and what it takes to make it. (F25, Q14)

G: I think I didn't know much about archaeology and I think I'm a bit more interested because there's so many different things that have to be in here, dig things up as much, digging them up and saying what they are and stuff.
M: You get a better appreciation, you know//
G: //I think I can, I think I understand a bit better because before I really hadn't thought the kind of thing like it wasn't so difficult, like it is when you try it like on your own. (F8, Q13)

Three family members (2 children and 1 adult) stated that as a result of the visit they decided to get more involved in similar activities. One of the children wanted to create an archaeology museum and the other one decided to follow the volunteer's instruction on how you can spin wool at home. The adult family member said that the visit reinforced her wish to join an archaeology group in her home town:

W: Yes, I've always known that there's an archaeology group in Durham and I've thought about joining in with one of the children and I think I'm keener now to join. I've always wanted to but (...) you know, this raised my enthusiasm {laughter}.

{I: how did that happen?}
W: Because, just learning more about how these things are found out and how you can possibly be involved, you know (...) They {refers to the archaeology group} do lots of visits, you know, similar things and there's a lot of history involved. (F3, Q13)

Regular visits to archaeology museums and sites, and other activities such as collecting objects, educational courses and digging up things (or a mixture of all of them), can act as a means for vocational guidance. Three child family members mentioned that they had decided to become archaeologists when they are older.

It is interesting to examine family visitors' perceptions of archaeology. Family members in 27 of the groups specified that they expected the ARC to be about archaeology. They expected to be able to find out about archaeology or to learn more about it than they already knew. Thus, they accepted that the ARC – and probably other museums – presents the true story of what archaeology involves. The value of knowing about archaeology seems to be self-evident for these visitors[31]. One adult family member said that he expected the exhibition at the ARC to present the archaeology of York in particular. Another one saw the exhibition as a representation of 'the results of archaeologists' work'. A similar idea was expressed by an adult who referred to the exhibition as showing the 'practical side of archaeology'.

Two more adult family members associated archaeology with 'things that have been before' or 'things of the past' which is a common image of what a museum is as well. In addition, there was one adult who referred to archaeology as 'a painstaking process' while a child implied the same idea. In both cases, these family visitors mentioned that they had not appreciated how much effort is needed and that their attitude changed after doing the activities for themselves. Finally, there was an adult visitor who found the concepts involved in archaeological work difficult, in particular the concept of time. At another point during the interview, this family member mentioned that he liked history because it is easy to follow and understand as it is already 'filled in for you'. Eleven family groups out of the 27 groups used the term 'history' either as an alternative to the term 'archaeology' or as compared to 'archaeology'. Here is an example of the relationship between archaeology and history:

M: Just an insight into how archaeology is done, how the archaeologists determine from the dig what, you know, what will become history. (F25, Q5)

It seems that in the latter quote the visitor saw archaeologists as being actively involved not only in field archaeology but also in interpreting their finds and, hence, in writing history. He also saw them as making choices about what information will be included in the story they tell.

[31]This is supported by Merriman's (1991:96-118) study.

Another family member approached the subject in a different way. He saw his visit to the ARC as part of his trip to York. He wanted to find out more about the history of York and he perceived archaeology as being a part of this. Finally, one another adult said that she had heard that the exhibits were 'stones'. Hence, she assumed that it was about 'the past' which meant it was a 'history museum'.

7.5.6 Ideas about hands-on museums

Family visitors, in particular adults, referred to the hands-on aspect of the exhibition in terms of physical and intellectual accessibility. As was also seen in the previous two case studies, social or cultural accessibility was not an issue for these family visitors. Age was occasionally mentioned in relation to the children in the groups. The socio-economic and educational profile of the adult family visitors showed that the vast majority were well-educated, white, middle and upper-middle class British people. Moreover, a large number of the family visitors were highly motivated with a special interest in archaeology and history. This indicates that the ARC attracts a different audience to those attracted by the previous two museums.

Family groups at the ARC had a strong educational agenda and were able to relate to the subject presented through the exhibition, hence, they saw the visit as an important part of their lives. They were convinced that it was worth knowing about archaeology. The ARC was among those museums which were seen as an appropriate representation of York or the whole of Britain. It is of significance that adult family visitors often referred to archaeology (and history) or to particular artifacts in the ARC as objects of appreciation or admiration. This response is related not only to the subject of the exhibition but also to the fact that the exhibition includes real objects which was not the case in the exhibitions visited at the MSI and at Eureka! Being able to experience archaeological artifacts, was mentioned[32] in the family interviews. It was referred to as adding something special to the experience that went beyond a mere educational experience. Family visitors were trusted with handling 'real things' and doing exactly what 'real archaeologists' do. The impression of the visit was quite deep and helped them to 'appreciate' what they saw and did. It was as though a very special relationship or bond was developed between the object and the visitor.

Thus, family groups did not refer to specific learning outcomes. They often used the term hands-on to describe the exhibits. Other terms used were 'to touch/hold/handle/examine/explore/do/feel/experience/see what's like/see for yourself/look properly/get involved/take part/find out/participate/have a go'. They described the experience as 'exciting', 'enjoyable', 'interesting', 'fun', 'pleasing' and 'therapeutic'. They saw the interpretative approach of the exhibitions as being 'imaginative', being 'intuned with excitement', 'fascinating' and providing the opportunity to 'use all senses'. It was also thought to be

[32]Nine family groups particularly referred to the opportunity to touch the 'real thing'.

'more educational' compared to exhibitions with static exhibits, to give visitors of all ages and particularly children the opportunity to 'learn in different ways' and 'gain an insight'. Hence, visitors saw themselves as being actively involved not just passive receivers of the museums messages.

Being able to touch things and get involved was perceived by four child and sixteen adult family members (in 14 groups) to be educational and to help them appreciate things. The exhibition was perceived as being intellectually accessible for both children and adults. The following extracts are typical examples of this point:

> B: This is a lot better and you learn a lot more things that way. (F15, Q14)

> M: We've spent two and a half hours here and really time flies by when you're doing things and I think we'll remember it more because we actually handle this rather than just read about it.
> W: Yeah, you learn in different ways rather than just reading, you know, you handle it.
> B2: You understand it much better. (F8, Q14)

> M: I think old styles where you have hundreds of objects laid out and you can't actually touch them, you can't appreciate them what they are. You can't just reach them by looking at them. (F16, Q14)

One family member, referring to her learning experience in the ARC, mentioned that she found it a good start for beginners in archaeology such as herself. Learning was not 'high-pressured or high-powered'. Instead she could handle objects at her own pace and 'absorb' more than she would in a hands-off museum.

Two children and three adults (in 5 groups) mentioned that taking part in the activities involves all your senses. This made family members think about the materials used to make the object and the amount of work needed to make them. It is closer to everyday activities performed by family visitors. The following extract is a typical example of this point:

> W: {...} This is a touching one that's why we came, wasn't it? It's really important because you can come and feel the things. You've got different sensors eyes, ears, touch and museums are generally about eyes, aren't they? Not often, (...) I mean, here there's a bit of information as you start, eyes and ears {points at her eyes and ears as she says that}, but very often you don't use that. And that was why really {we came}, the mixture of sensors. (F5, Q1)

Having the opportunity to stitch a replica Roman shoe, made a 4 year old child to concentrate on the actual movement. This is exactly what he depicted in his drawing

(figure 7.2): the zig-zag shape represents the shoelace when it is tied. When he was asked about the drawing, he said that it was a shoe. He transfered his tactile experience into an image which described his action.

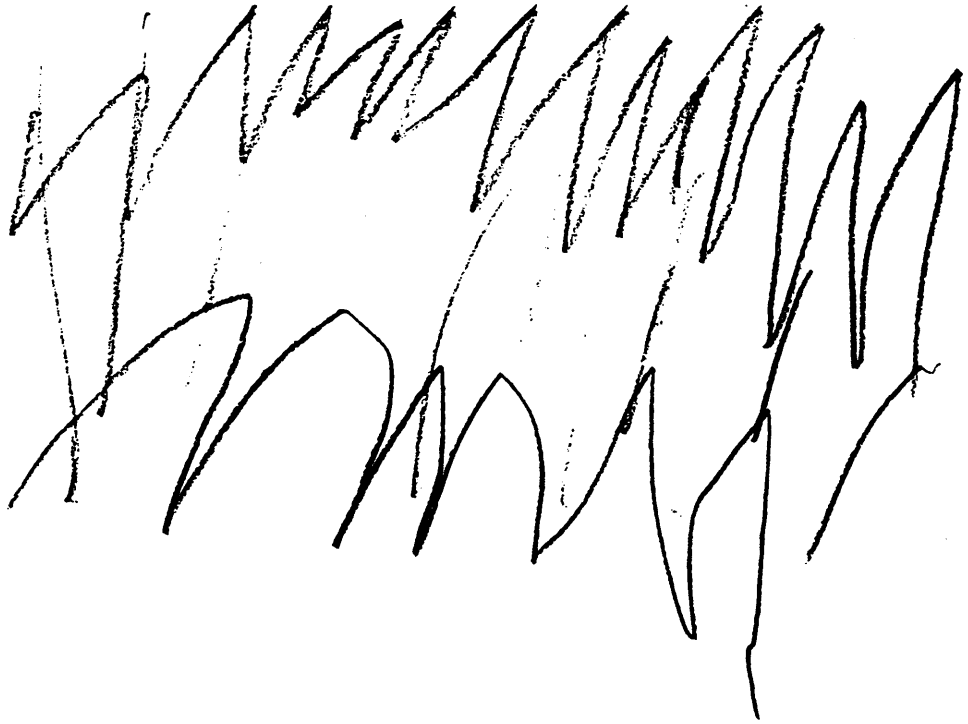


Figure 7.2. *Drawing of a shoe (boy, age 4).*

The adults in eleven family groups mentioned that the hands-on approach is particularly good for educating children – especially young ones – although the vast majority of them admitted having enjoyed it as well. In this case study as noted in that of Xperiment! and Eureka!, the need to touch was associated with childhood. On the other hand, another five adult family members claimed that it is good both for children and adults as there is something for everybody:

> W: I think it's more for children (...) I don't think it's so important for the adults but I think that young children have to be able to touch things. That's how they learn so//
> M: //And it also keeps them interested and they behave better.
> W: It keeps them interested, I mean, we came to the C. museum here where you can't touch things and they were just in and out. They looked at things very very quickly and then out again whereas here they can take part and touch things and they're involved. (F4, Q14)

Similar concerns about children's behaviour and concentration span in traditional museums were shared by another seven adults. Often it was related to previous family visits to other museums where children had to be reminded not to touch. One adult saw it as misbehaviour resulting in the family having to leave the museum. Another adult thought that it is not fair for the child to have to conform with this code of behaviour. Six child family members also referred to their experience in hands-off museums. This is what two of them said:

B1: And you can't touch anything, you feel like you have to be really, really (...) extremely careful not touching anything and be careful//
G: //And you don't enjoy it that much. (F8, Q14)

Five adult family members referring to hands-on museums said that they found them more relaxing to visit with children. Being able to touch in a museum seemed to affect the time spent in it or visitors' sense of time:

W: It's just more interesting, the time that you spend even goes faster, you know, because you go from one thing to the next and you get doing things rather than just reading from the text. (F8, Q14)

W: {...} It was great, we really enjoyed it and we forgot about lunch {laughter}. (F3, Q14)

The removal of time constraints together with the fact that visitors can touch everything, makes the exhibition physically accessible. There was a sense of freedom of movement and choice and immediacy of an experience as family visitors were able to get involved and see objects from different angles. An 11 year old boy described this as follows:

B: It's more interesting than the ones you can't like tell what they {the objects} look like 'cause they're in boxes. You can't actually go 'oh, that's on the back of this'. Here it's like you're there with them. It's not like everything is boxed off away from me. I think it's a lot better because you feel more free to do things. (F9, Q14)

Seventeen family groups expressed their ideas about hands-on museums by comparing them with hands-off museums. This is something that a lot of families in all three museums did as they were more familiar with hands-off museums. Family members' associations of hands-on and hands-off museums were quite similar across the three case studies. The ideas that 'time flies' as a result of intense concentration and direct participation in the activities was, however, much more prominent in this case. It is closely related to Csikszentmihalyi's (1988, Csinkszentmihaly and Hermanson 1995) idea of 'loss of the sense of time'. Visitors' ideas are presented here in opposed pairs (figure 7.3).

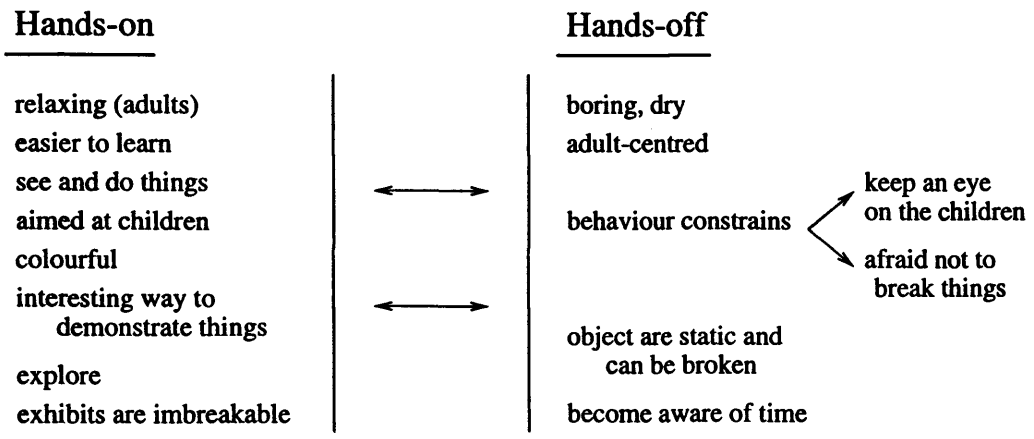


Figure 7.3. *Characteristics of hands-on and hands-off museums according to the ARC family visitors.*

What is interesting in this diagram is that a couple of family groups in the ARC referred to the volunteers and their role. They were seen as replacing written information in hands-off museums and as another source of acquiring information about the exhibits in the ARC.

Three adult family members mentioned that there is no comparison between the two type of museums. The communication approach of a museum was perceived to depend on the 'aim of the institution' and 'what they try to teach'. Another adult perceived them as 'different aspects of the same thing'.

Only one adult criticised the ARC for having activities which are 'a bit programmed' and for having less objects than he would like to have seen. Also none of the adult family members were concerned about the way children used the exhibits as was the case in the other two institutions. It seems that such concerns are associated with press-button exhibits as was the case in the previous case studies. Moreover, the structure of the visit and the presence of volunteers influenced the time spent on each exhibit in the ARC. Only a couple of adults mentioned that they would have liked to stay longer at the exhibits but that they had to follow the children's pace. However, this was seen as a normal behaviour since the children were quite young.

Finally, the adult family members in two groups saw the hands-on approach as gathering momentum among museums:

> W: This is more interesting because it gives them more of an insight. This is the way to go, this is the modern way to go, I think, and they should be able to do it because it gives them {the children} more of an interest instead of looking and reading and that's the way I feel anyway. It gives them fascination as well. (F29, Q14)

> W: Mmh, yes. I think museums today have intuned with excitement. I mean, they

> are much more imaginative and, you know, if they can't put everything out on display for you to touch there's always something there for you to see and feel and I think that's nice. So I think it's great, yeah, I mean, I don't know, I think probably the majority of the museums are trying to do it now. I mean, this {the ARC} is quite amusing because there's all open for you to touch, there's nothing behind glass cases or anything but I think a lot of museums are moving towards that. (F9, Q14)

By being hands-on, the exhibition allowed family groups to get physically and intellectually involved. This gave them a greater opportunity to be actively involved and in control of their learning experience. They mentioned that they went beyond the exhibit or the activity itself. They were able to appreciate what they did and the experience was a very powerful one.

7.6 Conclusion

On the whole, the family groups studied in the ARC were different, in some respects, to those studied in the previous institutions: there was an equal number of women-men and girls-boys; there were quite a few teenage boys and girls; only three family groups included grandparents; and more adults were well-educated and from a middle or upper middle-class background. However, the family visitors' profile was similar to the profile of the families in the other two museums in other respects: more than half of the family members were from the age range 35-44 and 5-11; there were no visitors from an ethnic background; and a number of adults were in occupations related to the subject matter of the exhibition.

The ARC was perceived as having a place on some kind of socio-cultural itinerary. This idea was prominent in both previous cases studies. What differentiates the above cases is the way the itineraries are prioritised for each of the institutions. Once again, the family visitors at the ARC valued some of the itineraries more than others. This pattern is repeated for all the cases studies. Family visitors saw the ARC primarily as an educational institution. They also expressed the idea of 'doing' a number of things as part of their visit to York. York was perceived to be one of those places that someone should visit, especially with children. This point differentiates the ARC from the previous case studies. A visit to the ARC is only part of the whole experience and, at the same time, it is seen as an appropriate representation of York or even Britain. Being with one's family and having an enjoyable experience were also valued by these families. For some adults, museum visiting was an activity which should be part of people's life cycle.

Being motivated and with a special interest in archaeology, family visitors at the ARC used all information available to them to plan their visit and to create a series of expectations. Child family visitors seemed to have object-specific expectations as compared to adults who had more subject-specific ones. Children wished to share the experience with

other family members. Adults wanted to influence their children's educational experience and, in some cases, share their interest (professional or other) with them. Family members (both children and adults) were involved in various activities related to archaeology or history.

Families enjoyed the social interaction between the group and the ARC volunteers. This was often mentioned in their reconstructions of the visit. They tended to read the exhibitions in terms of 'the history' and 'the object study' themes. The first referred to the past or a comparison of the past and the present. The second referred to the skills used to complete the activities. This, in some cases, involved taking visitors beyond the activity and making them appreciate the artifacts studied and the role archaeologists play in our understanding of the material evidence. Although a lot of the families were archaeology enthusiasts, they found the experience realistic which increased their appreciation and understanding of the subject matter. This was also due to the fact that the experience was multisensory and combined both cognition and affect. The vast majority of the visitors could relate what they saw in the ARC to their personal experience and referred to the continuity of the past through the objects used then and now. Many of them commented on the relation between archaeology and the past and archaeology and history.

Summary The ARC is a medium-size archaeological museum. It has been very popular with family groups (who usually visit on weekends) with a special interest in archaeology. This was what characterised the families who took part in this research and could also be one of the reasons why they spent such a long time (an average of 60 minutes) in the ARC. Learning about archaeology and/or history was what attracted them to York, a place associated with archaeology. As was the case with families at the MSI, the differences in the personal agendas of the child and adult family members at the ARC were distinct. Moreover, adults (the vast majority of the adults in the ARC were parents) were equally concerned with the social aspect of their visit. As a result, the family visit plans revealed three types of agendas ranging from open to fixed. Similar findings derived from the families at the MSI.

The ARC represents an effort to introduce the public to the real archaeological work. This notion informed the design of the Centre which includes the exhibition area – known as Archaeological Activity Area (AAA) – studied here and the Finds Department (on the first floor) where Finds Researchers work. To achieve its aim, the communicative approach employed combines two elements: hands-on activities involving the handling of archaeological material and the volunteers who interpret the activities. Both elements had a strong impact on the family members as seen from their reconstructions of the exhibition. Being able to touch the artifacts enabled families to understand how they were used and to compare them with similar contemporary objects. The interaction with the volunteers encouraged a high level of involvement in the activities. The interpretation was 'customised' and there were many opportunities for explaining the structure and the

aim of the Centre to the family visitors. It was therefore more likely for the ARC agenda to influence the family agenda. Indeed, there were family visitors whose reconstructions reflected the messages that the exhibition team intended to communicate.

However, the educational background of the adults and the family agenda also played an important role in these reconstructions. This was particularly evident in the case of the families who associated archaeology with the past and of those who focused on the skills associated with the study of objects. These reconstructions derived from previous experience with heritage type exhibitions and hands-on type exhibitions which focus on how rather than why things work. In those cases, although the reconstructions related to the content of the exhibition, the main messages were obscured by what the families brought with them to the visit.

Chapter 8

Discussion and conclusion

This thesis set out to explore the frameworks through which families experience a visit to a hands-on exhibition and respond to it. This was achieved by looking at family members' own accounts of their visit, by observing them during the visit and by combining the data. Although this research refers to a relatively small number of families, it was carried out in three different museums and was also compared against previous research. Conclusions of general significance can be drawn from this study and may be used as a general framework for thinking about family visitors and their needs.

One of the most significant aspects of this thesis is its attempt to understand the formation and function of family agendas. The starting point was the idea that the family agenda and the museum agenda interact and influence the visit and the way it is perceived by family visitors. The research questions included the concept of a family agenda for learning in its broadest sense. Indeed, family members construct a shared understanding of the world. Social interaction and language play a central role in defining and sustaining meaningful concepts. This is a continuous process which involves all family members acting within a specific socio-cultural context. Hence, this shared understanding makes sense only within a particular cultural framework which provides the starting point and the background for this process. On the other hand, there is space for families to create and negotiate their individual roles within a given framework, the socialisation process. Hence, these constructs are also defined by attributes or characteristics of the families as functional members of the society. Social, ethnic and racial background influence family relations and are sources of family diversity.

Therefore, families bring to museums a shared understanding of the world which is constantly reconstructed, negotiated and refined. By the same token, family museum agendas are not constructed in isolation. They are subject to the same process of construction, negotiation and refinement. This is a dynamic process which involves all family members. It is also a spiral process which is repeated every time a family group visits a museum or engages in a related activity. The latest museum visit influences the agenda and at the same time the family agenda influences the way the visit is perceived by family members.

This feedback process creates a new agenda which is employed in the subsequent museum visit (of course, experiences which family members acquire between visits affect the family agenda).

8.1 Methods

The methodological approach used in this thesis provided very rich material. This material can also be used comparatively in other cases which cannot always be done using quantitative methods. However, it is a method which entails a greater input of time and labour (for data collection and analysis) as compared to quantitative methods.

Most of the aspects of the research seemed to work well. Although the observation data were important, it did not seem to provide any useful patterns on its own. It was also difficult to record verbal exchanges without being obtrusive at the same time. The observations were, however, very useful when related to the family interviews. They helped to understand and interpret what families said during the interviews. Observing family members during the visit provided a more complete picture of the families as social groups. This was particularly the case when the groups were divided in dyads, triads or stayed together. This reinforced the picture of the diversity of family forms and arrangements.

Since the emphasis was on family visitors' accounts of their expectations and experience of the visit, the family interviews provided rich material. Having open-ended questions for both adults and children generated particularly interesting data. This revealed family visitors' ideas about the visit. Of particular importance was the language families used to frame the issues involved. The family interviews were sensitive to the social nature of the groups. It gave them the opportunity to talk about their expectations and experience both individually and as members of the group. This worked very well since for the vast majority of the families it progressed as a discussion between the family members. The role of the interviewer was to ask questions on the specific areas of interest. In retrospect it would have been interesting to have gathered data on other aspects of the family museum visit such as the role other cultural activities carried out by families play in the development of their agenda; and on different types of family groups such as grandparent and other relatives visiting with children and multigenerational groups. These were some sources of variations among the groups studied which could not be investigated in this study due to the length of the family interview. Another interesting aspect of the family museum visit worth investigating would have been an assessment of learning outcomes as a result of the museum visit. This was not possible to do in this research for both political (related to the museums) and practical (related to the design and time-scale of the research) reasons.

Children's drawings were also a valuable tool for uncovering children's (especially the younger one's) experience and making their voices heard. Further research could help develop the means to measure museum learning by analysing children's drawings.

Based on the analysis of the data, five factors have been identified as determining the creation of the family museum agenda (figure 8.1): the family profile; socio-cultural patterns; the personal context; the social context; and the exhibition. The following discussion will follow the 86 families on a visit to the three hands-on museums/exhibitions as they were experienced and reconstructed by them, including the period before, during and just after the visit. It will try to show how the family agenda was influenced by these five factors and how it affected the family visit. It will also make suggestions about how the museum agenda can facilitate the family agenda by understanding how it develops and incorporating it in the planing of the exhibitions.

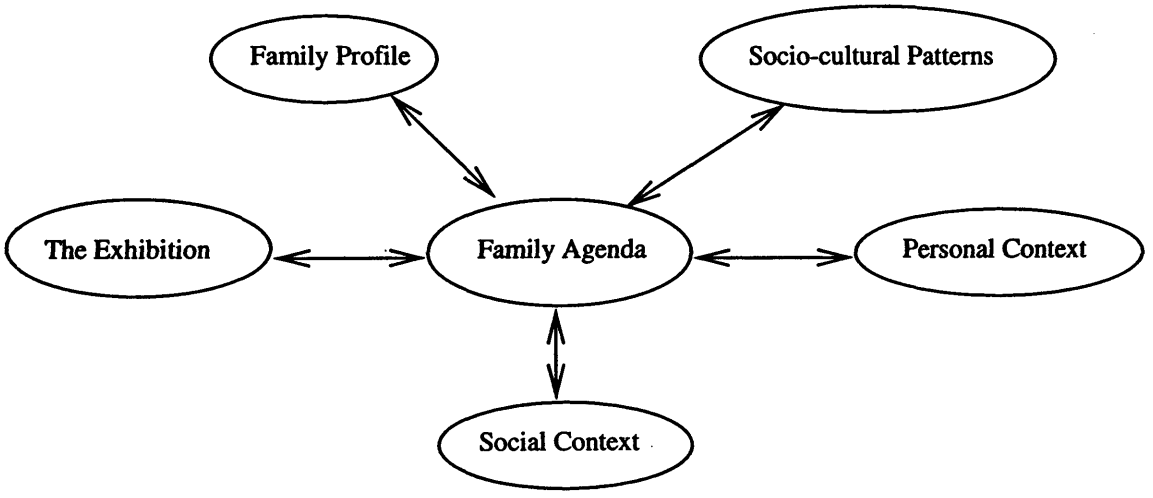


Figure 8.1. *Factors determining the family museum agenda.*

8.2 Family profile

The demographic characteristics of the families attracted by the three museums were similar in some ways: socio-economic and ethnic background (middle and upper-middle class white visitors). In the cases of Eureka! and the ARC education (well-educated) was a further variable. Higher education was not a factor determining a visit to the MSI as more than half of the adult family visitors had left full-time education on completing the minimum required stage. This finding, however, highlighted another important factor influencing the decision to visit these museums. A great number of adult family visitors were in occupations related to the museums' theme as presented through their exhibitions. This was often mentioned by adults during the interview as one of their motivations for visiting the particular museum. Gender and age of the family members varies according to the type of the museum. There were more men than women among the families who visited Xperiment! at the MSI, more women than men in Eureka! and an equal number

of men and women in the ARC[1]. On the other hand, there were slightly more girls than boys in the MSI. The same was noted for Eureka! while in the ARC the number of girls and boys was equal again. In terms of age range, the age group 35-44 was overrepresented compared to the general population in all three museums. Further, in Eureka! adult family visitors between the ages of 25 and 34 were also overrepresented due to the large number of very young child visitors to Eureka!, while in the MSI there was a larger number of over-65s (usually grandparents) compared to the other two museums.

Hence, it becomes clear that the audience of these hands-on museums or exhibitions are quite similar to more traditional museum audiences which is atypical with respect to the general UK population. This indicates that providing hands-on exhibitions might not neccessarily help museums to develop new audiences. Museums should specifically target segments of potential audiences and provide for their needs. However, the selected[2] families offer an insight into the diversity of families who do visit museums. Intergenerational family groups comprise one of the largest visitor groups of museums in the UK today. Their diversity and ability to change as a result of changing socio-cultural conditions imposes great challenges for museums as they need to understand and reflect these changes in the services they offer.

8.3 Socio-cultural patterns

Families chose to visit the MSI, Eureka! and the ARC for a variety of reasons which relate to the functions they are perceived to play in their social life. No significant relationship was found between the motivation for visiting and most of the demographic characteristics of the families. However, the picture could be different among visitors and non-visitors. Only the occupation of the adult family members was often related to an interest in the subject matter and more rarely to the hands-on approach. Occasionally, family members (both adults and children) referred to the connection between the subject matter and school lessons. In the vast majority of cases, there were more than two reasons in operation at the same time. The combination of motives fortifies the desire to visit. The cultural itineraries were the same in all cases but they were prioritised differently (table 8.1). These itineraries were: education, entertainment, family event, life-cycle and place. The hands-on museums or exhibitions were perceived by the great majority of the adult family members and many of the children as primarily educational institutions. A large number

[1]Note that that the majority of the observations and interviews at the ARC were carried out during weekends.

[2]Three stages of selection can be identified representing the intergenerational groups who participated in this study: selection based on close kinship relationships and on a limited number of members (up to five); self-selection as these were only the families which chose to visit the particular museums studied; and the selection process imposed by the museums themselves which are based on economic and cultural grounds.

MSI (29 families)	Eureka! (28 families)	ARC (29 families)
education (24)	education (21)	education (25)
life-cycle (22)	entertainment (16)	place (20)
entertainment (13)	family event (12)	family event (14)
family event (9)	place (9)	entertainment (9)
place (7)	life-cycle (6)	life-cycle (8)

Table 8.1

Cultural itineraries in operation among family visitors in all three museums. The numbers in parentheses refer to the times each itinerary was mentioned.

of families approved of the museums' effort to provide an enjoyable experience in an informal learning environment. They saw no contradiction between these two aims. On the contrary, a combination of both provided a stronger motivation for visiting. The visit was in most cases related to a special interest which family members had developed as a result of a previous visit or which they wanted to pursue by visiting the particular museum. The attraction seemed to be two-fold: the subject matter and the hands-on element of the exhibitions. This combination seemed to be a very important part of the museums' image. Of great interest is also the language family visitors used to describe their experience in terms of learning.

The variation noted in the prioritisation of the itineraries can be partly explained by the nature and location of the individual museum. Hence, entertainment is an important reason for visiting Eureka! as this is communicated by the institution to its audience, through material such as leaflets, posters, advertisements. In the MSI among the visitors to Xperiment! exhibition life-cycle was a strong itinerary due to the fact that the museum and its buildings have been part of the city's history for a long time and some family members had visited it before as children or with their own children. On the other hand, York is a well-known tourist attraction of which its archaeology plays a part. Visiting a range of venues including an archaeological museum as part of the visit to York seemed to be imperative. Hence, the ARC became for its family visitors an appropriate representation of York and Britain. The family aspect of the museum experience was also an important part of the motivation. This was equally important for both children and adults. This was particularly mentioned by parents, who did not have the opportunity to spend quality time with their children due to work commitments, and grandparents, especially those who lived far away from their children's' family and met them only on special occasions.

Families also had considered the practical part of their visit. A day out with children (in many cases with very young children) had to be carefully planned ahead to avoid disappointment. Factors such as the weather, time availability, distance, method of transportation, museum opening times, meeting physical needs of the family members had to be considered and negotiated before the visit. Frequent and occasional visitors had an

advantage over the first-time visitors as they could use their previous experience to solve these problems. Most importantly, they knew how to acquire the information they needed. The same differences were noted between family visitors in relation to their visit plans. Previous visits to the same or similar museums was the main source of information used by the families to plan their visit. Other sources included the nature or the image of the museum, time availability and the main motivation for visiting.

Three types of family agendas were identified in terms of the families' visit plans: open, flexible and fixed. Family groups with open agenda were usually on their first visit to one of the museums. They aimed to see the whole site and make their choices on entering the building and/or 'as they went along'. Families with flexible agenda were those who had visited a particular museum before or at least one member of the family had. Their plans included seeing favourite or recommended exhibits or exhibitions while the rest of the visit was negotiated during the actual visit. Finally, families with fixed agenda intended to see or do specific things which they had decided before entering the museum. It was a 'visit routine' which included a couple of alternative visit routes that reflected the mood and particular needs of the family members on the day of the visit. Hence, the 'routine' could be a subject of negotiation among the family members but it was less likely to be affected by the museum agenda. Families with fixed agenda had a stronger educational motivation for visiting, clearer objectives of the visit and often described learning as a process.

The negotiation of the visit was an important aspect of the visit plans. All family members were actively involved in planning their 'visit route or routine'. These negotiations were in many cases very subtle and most likely depended on the form and structure of the family group involved. In the few cases where the negotiations failed, this resulted in tension between the family members which affected their experience greatly. The museum agenda did influence the families' visit even those with quite fixed agenda. This was achieved in two ways: by introducing new exhibitions and by challenging visitors' ideas, preconceptions or attitudes. The latter was better achieved by the physical characteristics of the exhibition (its feel, use of colours, communication approach). The presence of gallery staff and opportunities for social interaction with them was another factor. There was a variation in the visit plans to Eureka! where there were not any families with fixed agenda. The nature of the museum, the orientation of the visit (child-oriented) and the size of the place seemed to have affected families' visit plans. The result was a greater opportunity for Eureka! to influence its family visitors' agenda.

8.4 The personal and social context of the visit

Cultural itineraries and visit plans are the first step towards understanding how family visitors' perceive their visit before they actually visit the museum. The personal and social context of the family museum visit are closely associated with the families' expectations

of what the visit will hold for them both as individuals and as members of a social group. This aspect of the investigation revealed a further variation in the agenda of the families according to the age and role of their members. There were different expectations between children, parents, and grandparents and other relatives. In terms of the personal context, children were mainly concerned with their own experience, they had object-specific expectations and focused on the 'doing' aspect of the exhibitions. Only a few older children in the ARC had subject-specific expectations and in a few occasions they referred to the relevance of the subject matter and school lessons. Parents had primarily subject-specific expectations and their visit was largely child-oriented, especially so at Eureka!

Grandparents (and other relatives to some degree) denied any personal expectation and stated that their visit was child-oriented. However, reminiscence seemed to be quite important among grandparent family visitors at the MSI. They seemed quite keen on sharing personal and family memories with their grandchildren. These memories were always related to exhibitions other than Xperiment! Hence, this indicates that their lack of personal motivation for the visit may refer to hands-on exhibitions in particular as they often considered these to be for children. Most of the family visits with other relatives were made in the context of the place itinerary where people had relatives visiting them and wanted to 'show them around'. There are many factors that influence the personal context of the visit. These include previous visits to the same or similar museums (or to other museums and cultural venues in general); an interest in the subject matter or the approach used ('how things work' or to have a first-hand experience); information and images provided by other activities families participate in (for example television programmes); and information acquired about the museum from a variety of sources with personal recommendation first in the list.

The social context of the visit was also different amongst these age groups. Many children did express their wish to share the visit experience with family members. In some cases this was linked with an opportunity to meet and spend time with their grandparents. Of course, children's expectations of the visit (and indeed other family members) should have been influenced by those they were visiting with. There is some evidence of this in this thesis, although this point should be further researched. For example, a grandparent among the Xperiment! visitors referred to the fatigue involved in visiting the Museum with younger people. Many grandparents were also observed in all three museums letting the rest of the family members see the museum while they waited for them. Furthermore, a family group consisting of a woman with her daughter in the ARC distinguished between different types of family shared experiences according to the participating members and the purpose of the activity. Thus, she distinguished between activities that they all enjoy doing together and activities that they enjoy doing in subgroups. The family's leisure time activities included family and mother-daughter, father-son activities. This distinction was made on the basis of shared interests. Further, children were involved in a process of

socialising other family members by bringing them to a museum they had visited before. This process often started when they returned home from their museum visit and shared aspects of the experience with other family members thus influencing the other family members' agenda.

Parents aimed at influencing their children's educational experience[3] (especially at the MSI and the ARC) and their enjoyment (at Eureka!). Furthermore, some adult family visitors at the ARC gave another social dimension to their visit as they considered the subject matter relevant to their own lives. On the contrary, grandparents and other relatives focused on the children's enjoyment and on their enjoyment of sharing the children's company. They claimed that their only motivation for the visit had been the children's enjoyment and the family aspect of the experience (sharing time with grandchildren, strengthening family bonds and passing on family history). Only occasionally did they express a concern about influencing the educational experience of the children in their groups. Grandparents' reactions in particular seems to be quite typical. As was mentioned in the first chapter, although they enjoy being with their grandchildren, their interaction is governed by the rules of boundary maintenance and of an obligation to assist relatives in need. Hence, they tend not to assume a parental role but only compliment it when they are needed, for example by taking the children out on a museum visit. Boundary maintenance was particularly evident within multigenerational groups (at least three generations) where the roles of the family members were much clearer.

8.5 The exhibitions

The museum visit is where family members renegotiate and refine their agenda. The nature (subject matter, media of communication and physical characteristics) of the exhibitions and visitors' expectations and preconceptions influenced the way the exhibitions were perceived and reconstructed. Although these reconstructions related to the content of the exhibitions they did not always reflect the messages that the exhibition team intended to communicate. Visitors' reconstructions were clearly related to their personal and social agenda for the visit which were often referred to during the interview. The child family visitors emphasised the kinaesthetic aspect of their experience through their movements[4], language[5] and their drawings[6]. This was particularly evident among Xperiment! child visitors who described and depicted their kinaesthetic activity. Also in Eureka!, children favoured exhibits which involved all their senses and kinaesthetic activity. On the contrary,

[3]Indeed, they often compared the museum with school. They either believed that the museum offers a more interesting educational experience or that the two institutions were complimentary to one another.

[4]During the visit by interacting physically with the exhibits and at the interview (use of bodily movements to describe the exhibits).

[5]Descriptions of actions and reactions often combined with the use of sounds.

[6]Bodily movements while drawing and also depicting movement by using different techniques.

adult family members in Eureka!, for example, preferred those exhibits which involved mental activity. Their preferences matched their personal and social expectations before the visit. Children had emphasised their wish to touch and do things in relation to specific 'favourite' exhibits. Adults (parents in particular) had made it clear that they mainly visited out of an interest in the subject matter and intended to influence their children's educational experience. Most of the kinaesthetic activities children preferred involved role play which does not seem to have a clear purpose or measurable outcome. On the other hand, hands-on exhibits in a science and in an archaeology museum seemed to provide a clearer sense of purpose for parents. Furthermore, both types of museums have a longer tradition than children's museums in this country.

The parents' intention to influence their children's educational experience was evident during the visit and the interviews. Adult family members in all three museums were observed exchanging information, reading labels (aloud and silently), using the provided support (material and explainers) and often sharing the information with child family members (cf. appendix C). This spontaneous teaching behaviour also occurred during the interview but varied with the specific museum and according to the children's age. It was much more prominent among parents at the Xperiment! exhibition and those visiting with young children. Parents in Xperiment! exhibition felt the need to compensate for the lack of structure and support[7]. Younger children received more guidance than older children which is in accordance with research findings based on Vygotsky's (Vasta et al 1992) work. According to it, parents of young children (between the ages of 4 and 10) tend to provide more guidance and to help their children perform a task. What seems to be particularly interesting in the case of the parents at Xperiment! was the techniques they used to transfer information and to help the children with the tasks. For example, they asked questions, using positive and frequent reinforcement. They provided clues about what the right answer might be and where to look for it. Often they used the pictures of the exhibits provided or they followed the sequence of the events as they happened during the family interaction with an exhibit in order to refresh the children's memory and relate to things. Finally, they provided an explanation often by using more abstract language or by introducing words new to the children. Hence, they tried to provide the children with the tools for developing their skills at gradually increasing levels of understanding and competence ('zone of proximal development').

In terms of constructivist thinking, children were not only assisted in constructing meaning out of a new situation or seeing it in different ways. They were also given the tools to construct systems of meaning through the use of language, physical and social interaction within a social environment. Adults used the resources provided by the museum and offered the necessary links to make the information meaningful for themselves

[7] As mentioned in the second chapter of this thesis, 'support devices' were among the factors contributing to visitors' satisfaction (Linton and Young 1992) by providing guidance.

and members of their family to whom they could relate well. Understanding the use of these techniques by family members can give museums an insight into naturally occurring information exchanges between family visitors and ideas of how to enhance this. This discussion highlights the fact that families with children of different ages and from different backgrounds and previous museum experience need to be provided with assistance at different levels and where they need it. For example, first-time visitors with quite young children need to be provided with a variety of information from techniques of problem-solving and how to use them to ways of using the available resources to meet their own needs. Frequent museum visitors have an advantage over occasional and first-time visitors as they can rely on their previous museum experience and knowledge of the subject matter to plan their visit and help other family members. Families consisting of grandparents (or other relatives) and children also need different kinds of support to those families who consist of parents and their children. Grandparents' motivations for visiting and physical needs should be considered when providing for them and their grandchildren. As mentioned above, there were cases in all three museums where grandparents were too tired to see the exhibitions with their grandchildren. As a result, the children saw the exhibitions alone. The social interaction and feedback in these cases were almost non-existent. Trained museum staff could provide support for this kind of family groups. Social interaction with the explainers (enablers or volunteers) could help children not only work and understand the exhibits but also encourage communication between children and grandparents during or after the visit.

In Eureka! and in the ARC clear structure, consistency and redundancy[8] played an important role in family visitors' choices. For example, in the ARC family visitors expressed their preference for those exhibits that involved a higher degree of interaction with volunteers. Social interaction with the volunteers was one of the ways the ARC could challenge families' preconceptions. In many cases, family visitors included in their reconstructions information acquired through this interaction. Also changes in their attitude towards the concept of time, for example, occurred as a result of their social interaction with the volunteers. The absence of social interaction in the Experimental Archaeology section made it less likely to be their favourite section. This was even more prominent in the case of the Computer Interpretation section where the level of sophistication of some of the programmes combined with a feeling of technophobia by some adult family members and its location made it the least favoured area.

On the other hand, the Xperiment! exhibition lacked clear structure. The exhibits were not interpreted in a consistent fashion while the information provided was not related

[8]The same information repeated regularly in the same way or in different ways for different people through support material and gallery staff. Further, there was a consistent way of interacting with the exhibits and where that changed it was clearly stated. The use of consistent a letter type throughout the labels and the organisation of areas within the exhibitions in Eureka! was particularly helpful.

to visitors' experiences or to other exhibits in the MSI. As a result, the adult family members (particularly parents with young children and those with an agenda for learning) tried to 'teach' their children and interpret the exhibits for them. In addition, when the family members were asked to relate the principles presented in the exhibits to their own experiences they failed to do so successfully. This indicates that family visitors need to be provided with a framework for their visit. The museum agenda should therefore be clear in order to meet visitors' expectations and challenge their own agenda. Providing a structure for the visit and reinforcing the main messages throughout the exhibition are essential steps towards communicating the museum agenda. It would be a good idea if the Museum explained to its visitors what is available and how they are expected to behave in a hands-on exhibition as soon as they enter. The ARC was particularly successful in doing this through its volunteers. The families were introduced to the activities and to the tools for problem-solving. Once the families were 'trained' in how to use the Centre the visit became less structured and the volunteers were available on request. Hence, the families were given a choice as to whether they wanted to ask help from the volunteers or work the activities on their own. This approach seemed to be flexible and sensitive towards family's needs as a social group.

Families' agenda and preconceptions affected the way they read and reconstructed the exhibitions. Furthermore, visitors' reconstructions were closely related to the educational background of the families – especially of their adult members – and to the age in the case of the children. Hence, the investigation identified alternative readings and also levels of abstraction used within those readings. As was also the case with visitors in the Food for Thought exhibition in the Science Museum (in Macdonald 1993), family visitors categorised the subject matter of the exhibitions according to culturally dominant ways. At the ARC, for example, family visitors made distinctions between the past and the present based on the objects and technologies used at the different times. Another categorisation – based on previous experience with museum exhibitions and possibly with books on 'how things works' – referred to the interactive element of the exhibitions. This type of reconstruction was quite prominent in the cases of Xperiment! and, to some extent, Eureka! and referred to those exhibits which required low levels of participation as for example push-button exhibits or exhibits where visitors were only allowed to change some factors and observe the result.

Families from higher educational backgrounds seemed to be able to reconstruct the exhibitions in terms of the intended messages. Among the families in Xperiment!, for instance, the level of abstraction used to describe the phenomena or the underlying principle varied according to the educational background of the adults[9]. Adult family members from a lower educational level and their children provided a phenomenological descrip-

[9]The level of abstraction used by different visitors also varied within each reconstruction. Even some of those who gave a phenomenological description used more complex language.

tion[10] based on a sequence of events as they observed them while interacting. Adult family members from a higher educational level and in a couple of cases their children were able to provide abstract descriptions[11]. Adults' educational level had a strong influence on the children's educational experience in Xperiment! It was shown that their ability to abstract was developed as a result of the social interaction within the group using the exhibition as a resource[12]. This finding concerns the issue of who has access to education and cultural products which has not been the focus of this thesis and should be further researched. What is significant for hands-on museums, which have been designed to be accessible to visitors of different ages and backgrounds, is that they should start from what visitors already know and present different levels of information. For example, in Eureka! new words were explained, the concepts and ideas presented were placed within family visitors' experiences starting from the concrete to the more abstract ones.

Apart from the adults' educational background, age was also a significant factor in determining the children's ability to abstract. According to Piaget (Vasta et al 1992, Sund 1976), higher-level abstract operations can be carried out from about the age of 11. This seemed to be the case among the children at the ARC where some older children (10 and 11 year old) expressed an appreciation and understanding of the past or of the archaeologists' role. These remarks go beyond what is immediately given introducing the possible and the hypothetical. This comes in contrast with the vast majority of the children at the ARC who focused on the task given. In some cases the children explained, for example, how they identified and categorised the archaeological samples at the sieving into animal, vegetable and mineral. Although the task clearly requires various forms of mental actions in order to be solved, the children needed to 'operate' on the world in order to understand it. This is what Piaget called 'concrete operations' extending from about age 6 to about age 11.

Family visitors often referred to alternative reconstructions or responses to the exhibitions which clearly helped them relate to and make sense out of the experience. Four particular features seem to be relevant: the ability of the exhibitions to make the information contained in the exhibits personal through different types of support (including opportunities for interactions with gallery staff); to relate them to visitors' previous experiences and to provide stimuli for following them up[13]; opportunities for social interaction and exchange of information between family members; and the ability of the exhibits to provoke emotional responses[14] or to stimulate visitors' imagination.

[10]This type of description referred to 'what happens' not 'why it happens'.

[11]These refer to fundamental principles and/or material property. For example, understanding an electric current requires an understanding of the property of conductivity for materials, the role of a closed circuit configuration and the presence of potential difference caused by the electric source.

[12]As was mention above, there were two children at the Xperiment! who were pre-readers and had no contact with the explainers.

[13]This was only noted in the case families at the ARC as a result of volunteers' advice.

[14]This includes the therapeutic effect some of the exhibits at the ARC had on visitors.

8.5.1 The subject matter and the communicative approach

All three museums tried to create exhibitions which would allow visitors to relate to science, technology or archaeology. In order to achieve this they used hands-on exhibits and tried (to a lesser or larger extent) to locate the subjects within a familiar and/or everyday context. This approach seemed to be quite successful among families.

However, family members' preconceptions were also significant as this affected the way the exhibitions were perceived and reconstructed. Notions about science and technology varied among families at Xperiment! and Eureka! in relation to their ideas about accessibility. Visitors in Xperiment! could only find relations between the exhibits and everyday life with some difficulty. They expressed the idea that science and technology are not accessible in everyday life and that they used visits to Xperiment! to achieve scientific literacy. They, thus, believed that the Museum could help them learn more about science and technology. Family members, effectively, said that they were responsible for the fact that science and technology is not accessible as they do not know enough about it; they were also to blame if they did not use the exhibits properly[15]. Although they thought that Xperiment! made science accessible and despite the fact that they used it as an educational resource, science as part of everyday life was as inaccessible as ever. What is more, they blamed themselves for not being able to make connections between the principles shown in Xperiment! and their application in everyday life. By the same token, they blamed their children for having short concentration span, for not reading the labels and for their 'touch-and-go' behaviour. They did not relate it to the design of the exhibition or the language and length of the labels. On the other hand, in Eureka! the use of everyday objects, which could be handled and allowed for different levels of involvement, located science and technology within an everyday context. It started from familiar and concrete ideas to get to the less familiar and abstract ones.

Families at the ARC made associations between archaeology and the past, and archaeology and history. They viewed archaeology as being about the study of raw materials of the past while history combines all the information available ('it is filled in for you'). In this sense, archaeology is more difficult to understand than history and also proceeds the latter. Another view associated archaeology with digging and history with the process of writing a story based on the material evidence. Only in one case, however, was the view expressed that archaeologists are actively involved in 'writing history' and making choices based on the evidence available. Finally, there was a local dimension to archaeology which saw it as part of the history of York.

As was mentioned above, families' preconceptions and agenda about the visit were influenced or challenged by the museum. Frequent visitors, for instance, seemed to be more attentive to new exhibits and were quite happy to accommodate them in their visit

[15]That is in order to learn and not to play with.

plans. First-time visitors were often impressed by the presentation of the subject matter. The design of the exhibition and the exhibits and the communication approach conveyed important messages on their own. Hence, family visitors were surprised to discover a different aspect of science or archaeology which was 'fun' and easier than they thought. In general, the hands-on approach was regarded very favourably among families in all three museums. Hands-on exhibits were described as physically and intellectually accessible and encouraged learning by exploring, especially for children. Adult family members at Eureka! appreciated the fact that children's needs were considered in the design process. The hands-on approach was also referred to as multi-sensory experience that gives visitors a sense of freedom (to explore, to choose, to be in control, to forget about time). Many family members (both adults and children) mentioned that it helped them become aware of different ways of learning including their preferred one. This relates to Gardner's (1985) idea of multiple intelligences, especially the personal intelligences (learning about one's self and others). Many adult family members also mentioned that their visits to hands-on museums and exhibitions gave them the opportunity to observe their children's learning behaviour. They commented that children's natural or preferred way of learning is through taking part and making things.

Families particularly mentioned the cognitive and affective aspect of the exhibits in all three museums. They referred to differences between learning from objects (ARC), exhibits (Xperiment! and Eureka!) or everyday things (Eureka!) and learning from books or at school. Families at the ARC particularly referred to learning as a result of the social interaction with the volunteers. They referred to the volunteers as a form of 'live text' who provided 'customised' information. The language family members in all museums used to describe their experience revealed that they saw themselves as active learners, constructing meaning through interaction with their physical and social environment. This notion of learning being an active process is supported by many researchers including Dewey (Frost and Kinssinger 1976), Montessori (Frost and Kinssinger 1976), Piaget (Vasta et al 1992) and Vygotsky (Moll 1995). Many adults mentioned that they used the museums for self-directed learning and for helping their children develop an interest in the subject matter. Some of them said that visiting museums with their family when they were young had exactly this effect. This idea relates to the place of the three museums on the life-cycle itinerary. Adults therefore seemed to be aware of the role the museums played in lifelong learning.

Occasionally concerns were expressed by adult family visitors about the children's attitude towards hands-on exhibits and towards labels. They were concerned that the children could only want to play with the exhibits[16]; that their concentration span was short and they ignored labels. They found that, when adults were with children, the results

[16]Play was perceived here as a goalless activity. According to Gardner (1973), adults are more comfortable with formal play which entails clear rules and goals.

were better. The language and ideas family members used to describe hands-on museums and exhibitions were of particular interest. They referred to features of the hands-on museums which are usually mentioned by museum professionals and communicated to the public through news releases, leaflets and other information material. However, in many cases (especially among the ARC visitors) family visitors' descriptions of a hands-on experience was similar to what Csikszentmihalyi (1988, Csikszentmihalyi and Hermanson 1995) has called 'flow experience'. When one is in the state of 'flow' one loses the sense of time and self. This was what happened to some families at the ARC who said that they became so involved in the activities that 'time flew' or that they 'forgot about lunch'.

8.6 Implications and applications

The above discussion highlighted the fact that the factors that influence the family museum agenda interrelate and extend beyond the actual visit. Every visit, and indeed any family activity, affects families' agenda. It is a dynamic open-ended process which involves all family members and the museum as part of a culture. Culture plays an important role in the formation of family agendas which is reflected in the the patterns found in families' responses to the exhibition. This thesis has looked closely at the family agenda, its development and nature and how it affects family visitors' responses to or readings of a hands-on exhibition. Unlike most visitors research, the investigation focused on the categories through which families described their visit to a hands-on exhibition. Although learning was considered as a possible category, the research did not focus on what families 'learnt' from their visit. Instead, it explored whether there was an agenda for learning and how it was described and perceived by family members. However, this did not exclude other socio-cultural functions which hands-on museums may serve and are usually ignored or taken for granted by most visitor research. This thesis has shown which factors influence the development of the family agenda and how it is refined and redefined after each visit. It has distinguished between different types of family agendas according to their visit plans, age and position in the family structure. It has also shown how the family agenda, through a process of interaction with the museum agenda, influences the visit and the way it is perceived by family members.

There were many positive aspects of hands-on museum visiting that this research highlighted. The families who visited the three museums were highly motivated, with clear and often quite specific expectations of what their visit would hold, and with an interest in the subject matter and the communication approach of the exhibitions. Many of them pursued a number of cultural activities including visiting (hands-on) museums. For the adults this was a means of pursuing an interest of their own and/or developing and building upon an interest of their children. In many cases, their motivation and interest were even stronger after the visit. This was mainly attributed to the 'doing' aspect of the exhibitions

and was seen as physically and intellectually accessible to all family members. In the cases where the gallery staff interacted with the families, their contribution to making things accessible was also acknowledged. Many families talked about their learning experience during their visit. They did not only learn about the subject matter covered by the exhibitions but they also learnt about themselves or members of their families as learners. The combination of different means of communication gave them more options and made them aware of different ways of learning. Hence, it seems that hands-on museums are in fact able to satisfy a range of family agendas.

On the other hand, one of the things this thesis has indicated is that hands-on exhibitions communicate both intended and unintended messages to their visitors. How can hands-on museums – and indeed any museum – ensure that their visitors' readings of the exhibitions are closer to the messages they intent to communicate? Visitors clearly bring to hands-on exhibitions their agendas. The family agenda is a combination of their preconceptions, personal and social agendas and their ideas about the subject matter and communicative approach of the exhibitions. These agendas are constantly negotiated between family members and challenged by the museum agenda before, during and after each visit. This process and how the family agenda influences the museum visit had only partially been investigated by previous visitor research. Further, the mission of the museums, on which the exhibition and education policies are based, have mostly been developed in terms of what *they* want to communicate to the visitors. This notion – still prevailing in science museums and science centres in particular – has created strategies 'from the top down'. However, as discussed above, knowledge can neither be developed nor communicated outside of a social context – that of the visitors. This creates a demand for exhibitions which can respond to a variety of needs and learning traditions. Hands-on museums are environments which invite people to get involved and make choices. Yet, how often are visitors encouraged to ask questions and investigate issues that are of interest to them? How often is the support provided tailored to visitors' experiences and competence?

The model of the family agenda proposed in this thesis can assist museum professionals to rethink their mission and to draft exhibition and education policies which acknowledge family visitors' background, prior knowledge and experiences, expectations and preconceptions. This model does not only illuminate family visitors' frame of reference but it can also guide museum professionals in their task to developing exhibitions and facilities for families. Since the family agenda is an on-going process extending before and after the visit itself, every aspect of the family-museum interface should be carefully considered. Museum professionals should recognise the role hands-on museums play in families social life, the associations they make with it and the frameworks through which they read and reconstruct (or remember) the exhibitions. Hence, planning and providing for families should take into account a range of factors ranging from the way the museum is marketed

to this particular audience to the ideas it aims to convey. This means rethinking every single aspect of the museum in terms of what it tries to achieve within the context of family visitors.

It is therefore essential for hands-on museums to carry out research on the nature of their agenda in order to determine how it is formed and communicated to families. Analysis of the exhibitions as text may help understand how these variety of messages are included in the exhibition development. The analysis can highlight whether there are gaps between the agendas of the museum and the family and indicate ways of bridging this gap. Further research could also examine the role that social interaction with the gallery staff (explainer/enablers/volunteers) play in the family museums experience and family learning in particular. Gallery staff may also communicate messages not intended by the exhibition team. It would be important to investigate the staff's motivation, especially in the case of volunteers. Clarifying what the museum agenda is for themselves, museum professional can then make it easier for its visitors to understand. The role of the museum professionals in shaping the exhibitions should be clear. However, visitors can and should be allowed to play an active role in this process. They should be consulted about and allowed to shape their own museum experience. This will transform hands-on museums into place for social interaction, debate and learning for all the participants.

Appendix A

Floor plans and photographs

List of Xperiment! exhibits:

1. Delay tube
2. Musical sonar
3. Ultraviolet
4. Sodium light
5. Bubble colours
6. Chandelier
7. Giant prism
8. Shadow box
9. Flash shadow
10. Writing with light
11. Laser drawing
12. Reflected words
13. Turning mirrors
14. Taking away colours
15. Infinity tunnel
16. Bendy mirror
17. See-through-it scope
18. Lenses
19. Lines of light
20. Kaleidoscopes
21. Liquid crystals
22. Fibre optics
23. Fibre optics sign
24. Sound paths
25. Sound bars
26. Percussion pipes

27. Convection
28. Camera obscura
29. Electrical circuit
30. Racing circuits
31. Making electricity
32. Electricity generator
33. Electroscope
34. Electric fleas
35. Photoelectric circus
36. Human battery
37. Puzzle table
38. Upside down periscope
39. Waterwheel
40. Back-to-front viewer
41. Electromagnet
42. Concave-convex
43. Shake hands
44. Hanging magnets
45. Triple mirror
46. Side waves
47. Spin me
48. Hot air balloon
49. Air track
50. Friction
51. Bernoulli bridge
52. (This exhibit had no name. It was described as a 'Victorian toy')
53. Seeing stress
54. Polariser
55. Syphon
56. Air jack
57. Bernoulli cannon

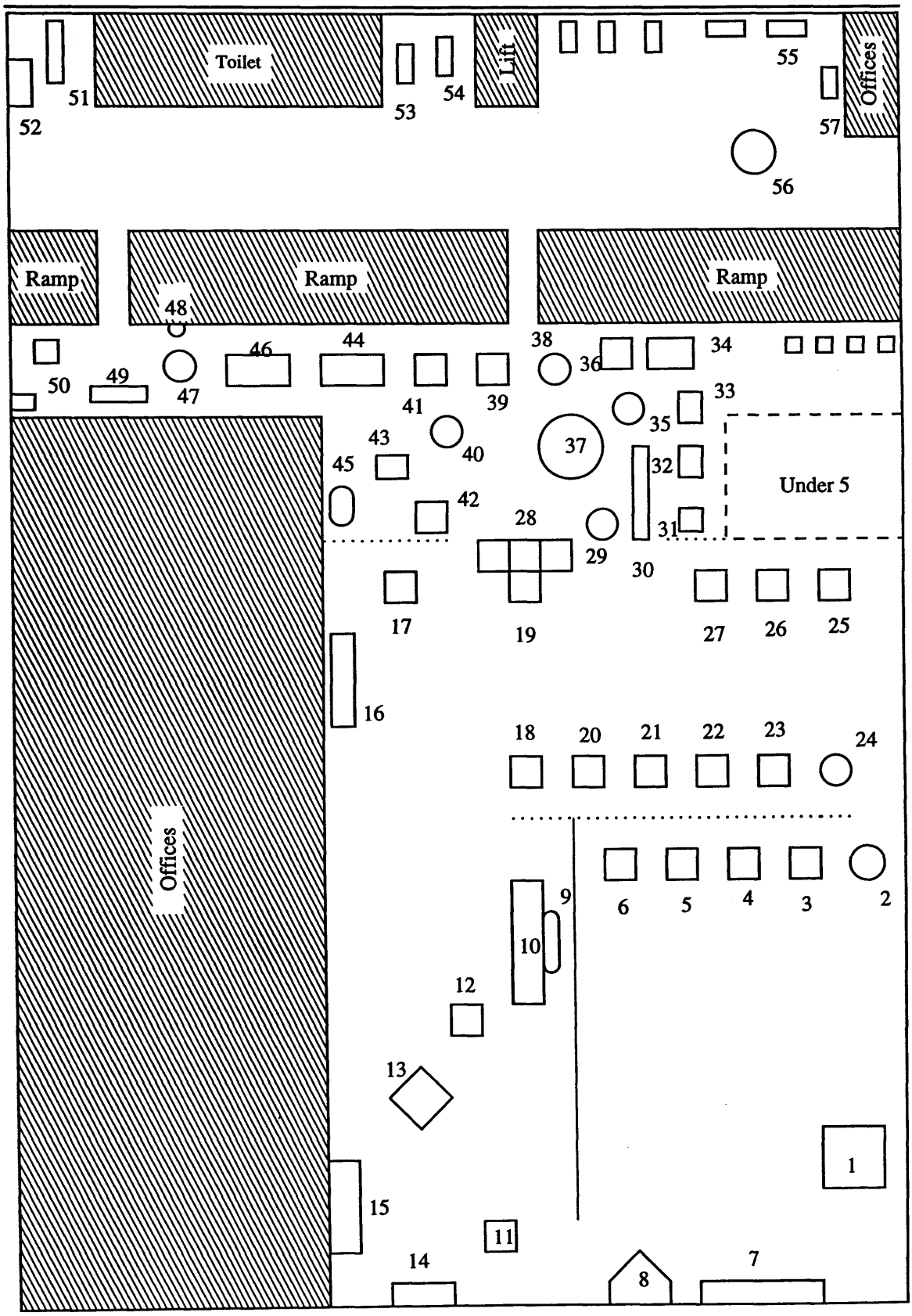


Figure A.1. *Xperiment! gallery.*

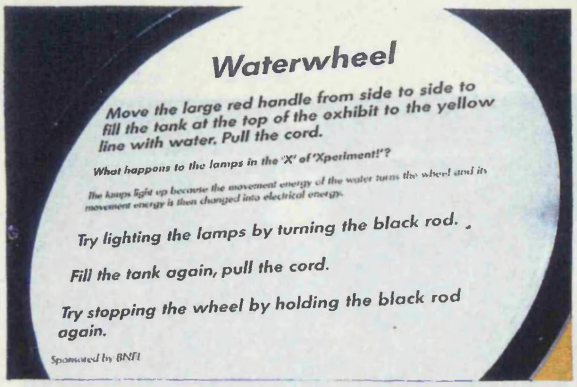


Figure A.2. *Giving instructions for the experiment.*

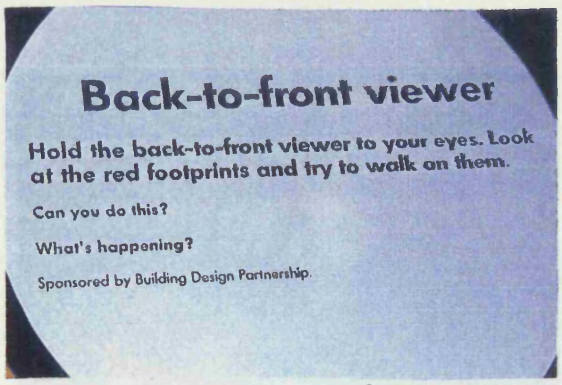


Figure A.3. *Describing the experiment.*

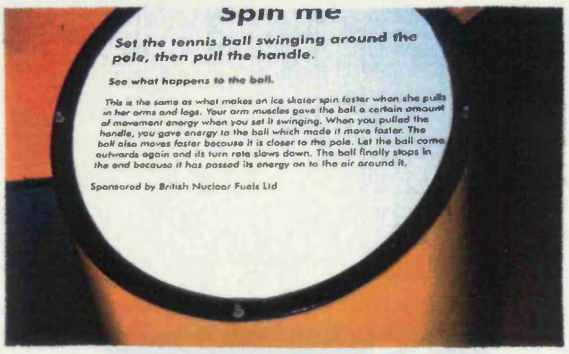


Figure A.4. *Explaning the experiment.*

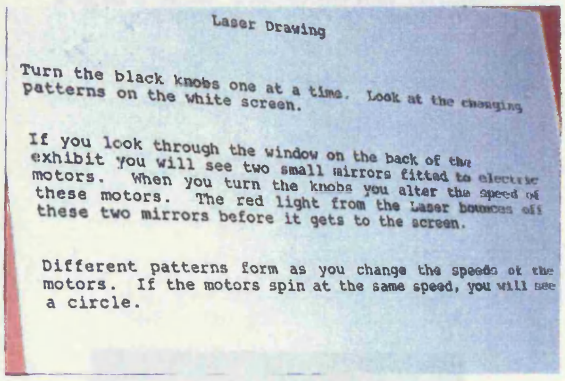


Figure A.5. *Uniform font size.*

Figure A.6. *The back-to-front viewer.*

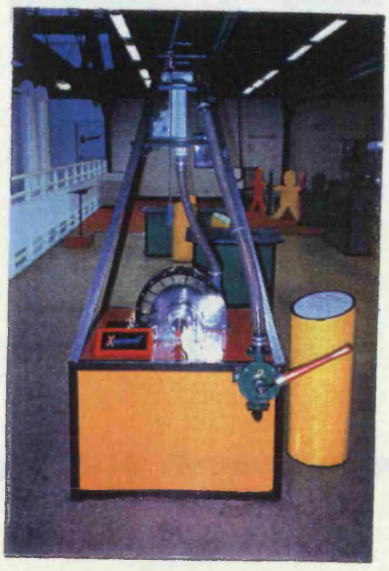


Figure A.7. *The waterwheel.*

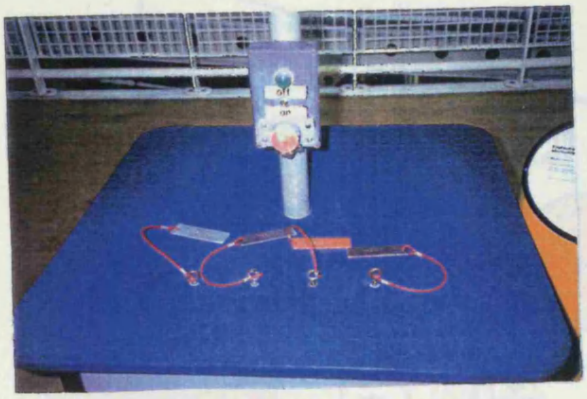


Figure A.8. *The electromagnet.*

Figure A.9. *The electrical circuit.*

Figure A.10. *The spin me.*

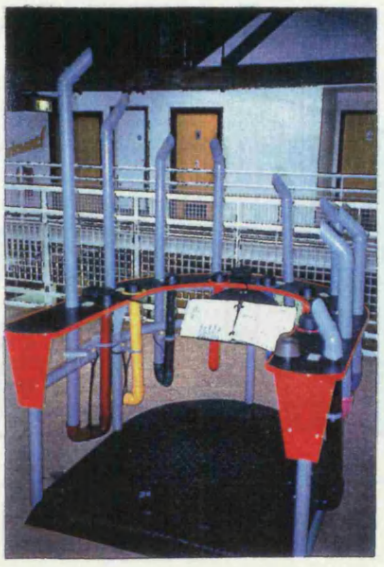


Figure A.11. *The percussion pipes.*

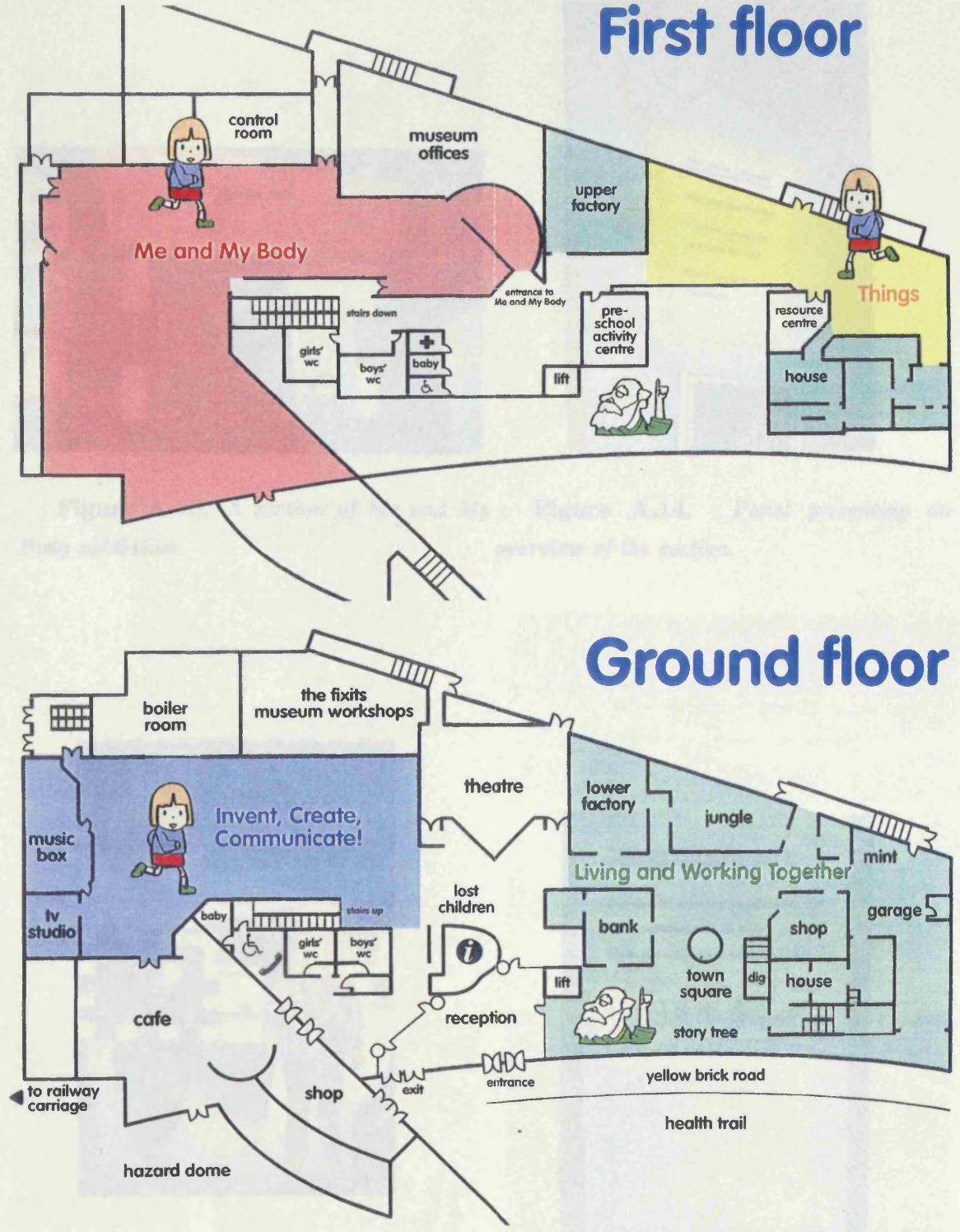


Figure A.12. *Eureka! (source: Eureka! leaflet)*

Figure A.13. *A section of Me and My Body exhibition.*

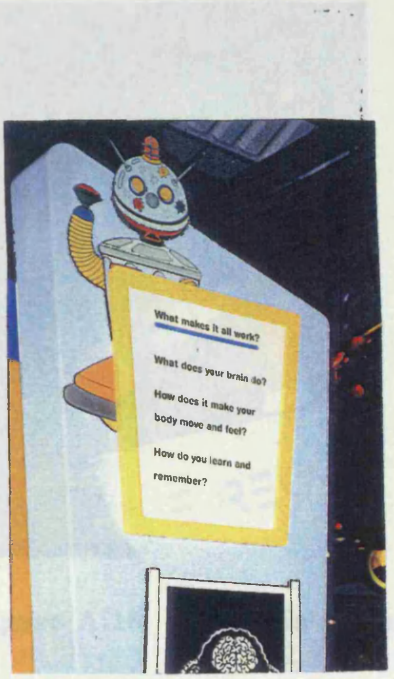


Figure A.14. *Panel presenting an overview of the section.*

Figure A.15. *An exhibit with its individual title.*

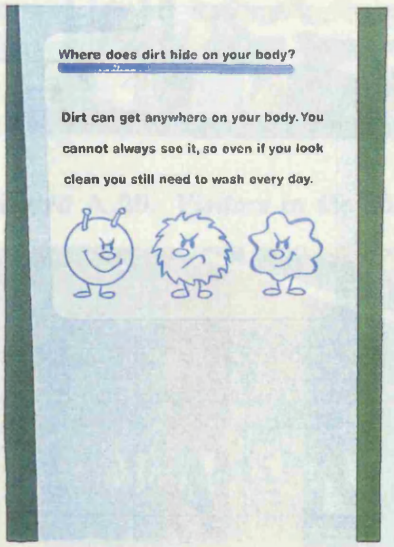


Figure A.16. *Example of label in Eureka!*

Figure A.17. *A family in the House.*

Figure A.18. *A family in the yacht.*

Figure A.19. *Family members sending a fax.*

Figure A.20. *Visitors in the Shop.*

Figure A.21. *Factory costumes for role play.*

Figure A.22. *Illustration of telphone communication.*

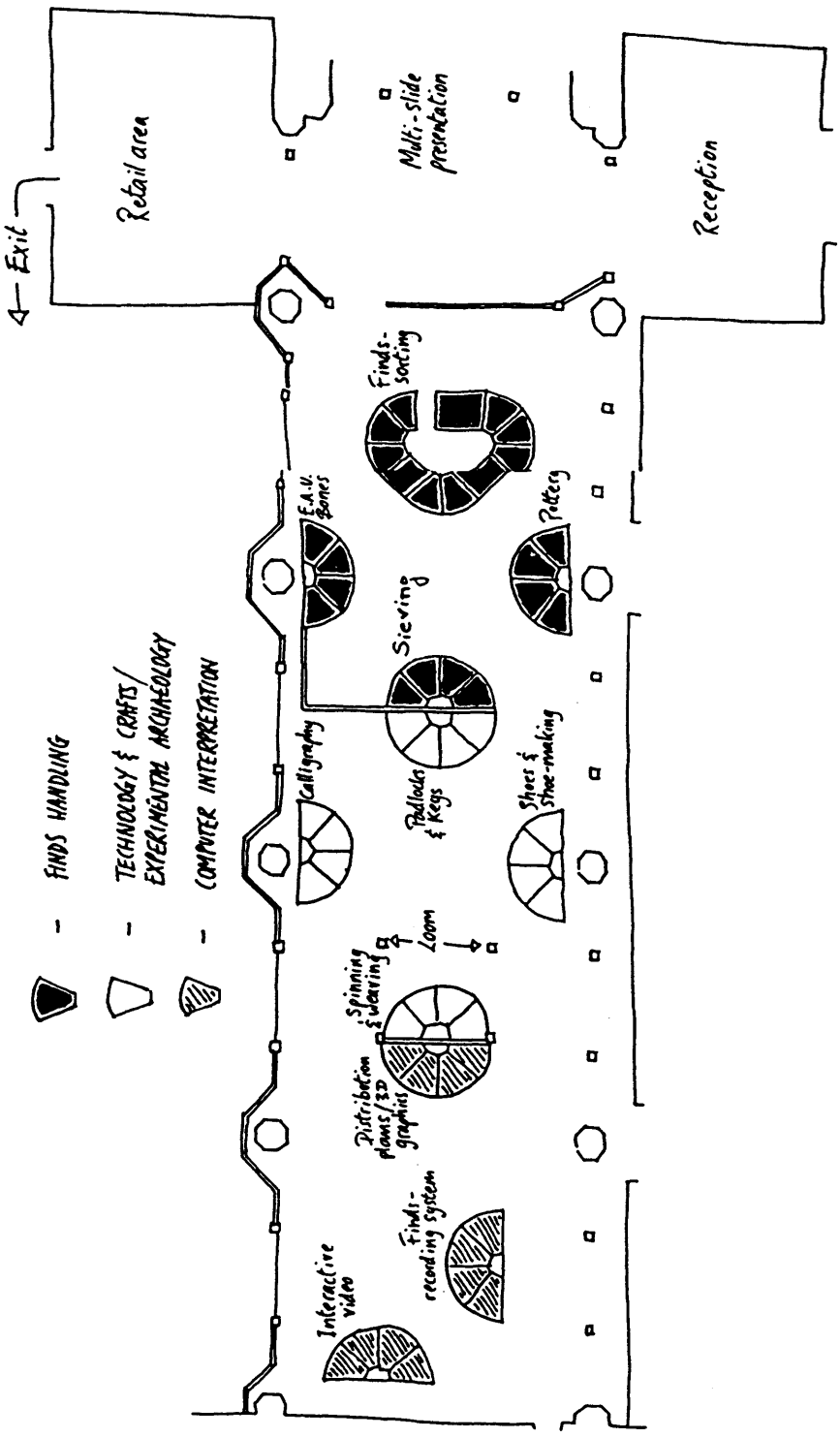


Figure A.23. *ARC (source: Kadow 1990:34).*

Figure A.24. *The finds sorting.*

Figure A.25. *The animal bones.*

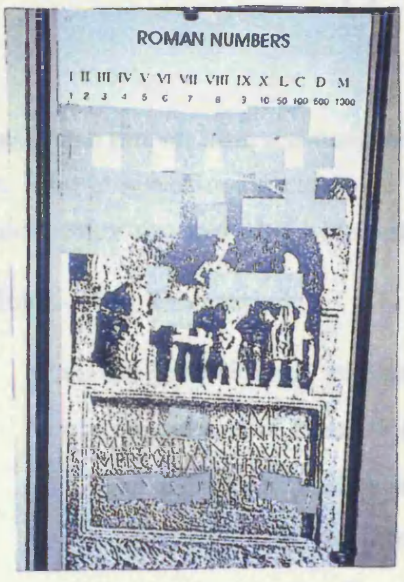


Figure A.26. *The Roman numbers.*

Figure A.27. *The sieving.*

Figure A.28. *A volunteer during a demonstration at the loom.*

Figure A.29. *A view of the Computer Interpretation (finds recording system).*

Appendix B

Observation guidelines

Emphasis was put on interactions (people, time and space) as means of constructing social reality. The observations focused on visual, verbal and kinaesthetic interactions; sounds and smells were not included here but they were partly included in the family interviews.

1. Intra-group interaction
    - verbal (questioning, explaining, making statements)
    - manifestations of relaxation or tension
        - affective (physical/verbal)
        - aggressive (physical/verbal)
    - movements $\Longrightarrow$ spreading or staying together
2. Spatial interaction
    - route followed
3. Interaction with the exhibition
    - gestural interaction (pointing, touching, interacting with exhibits)
    - written materials $\Longrightarrow$ read text (silently/aloud)
    - use of other material (museum guide, map, etc)
4. Interaction with the Explainers
    - who
    - when
    - why
    - how
5. Inter-group interaction (with other visitors)

- who
- when
- why
- how
- spoke with
- looked at

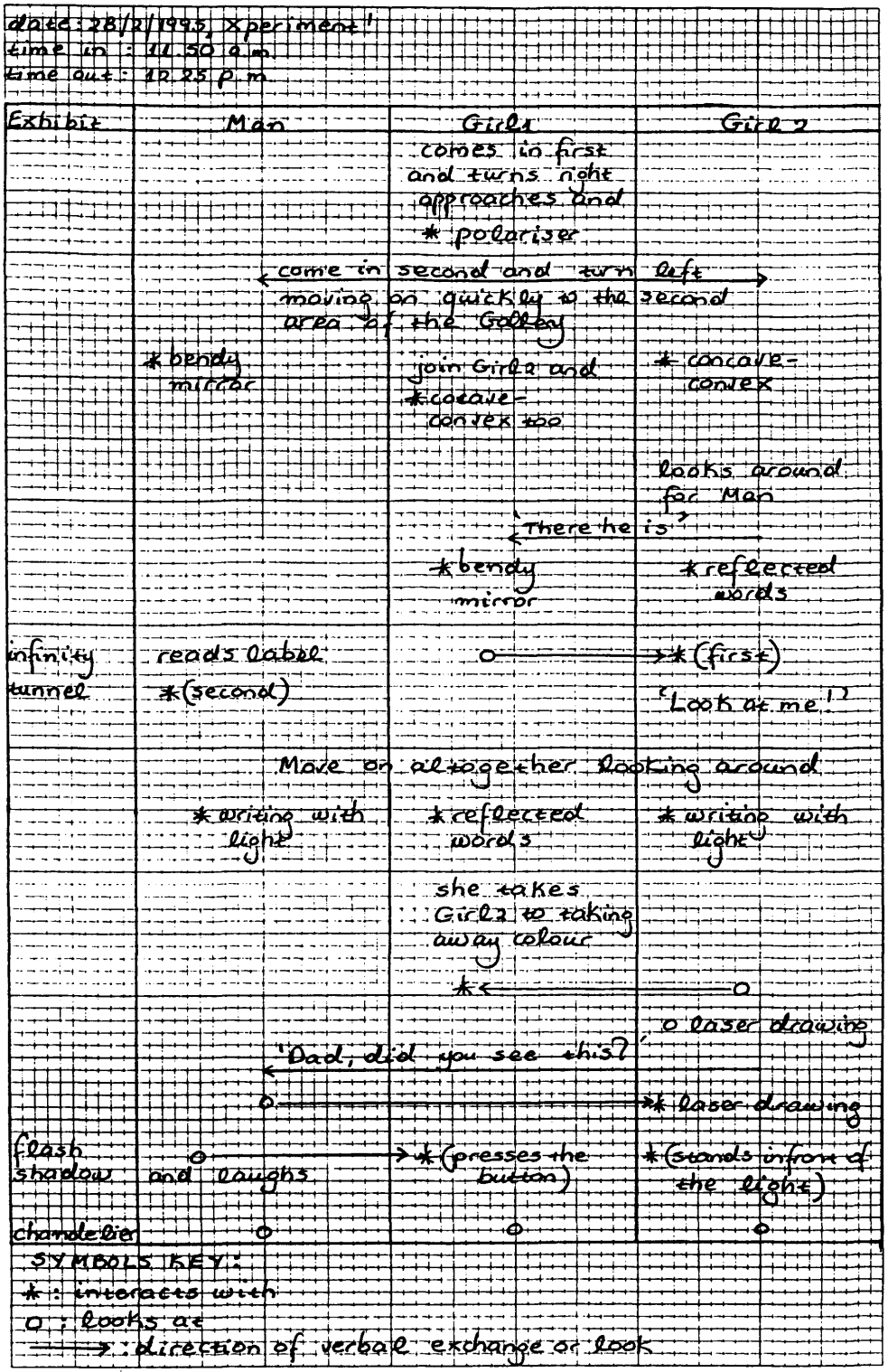
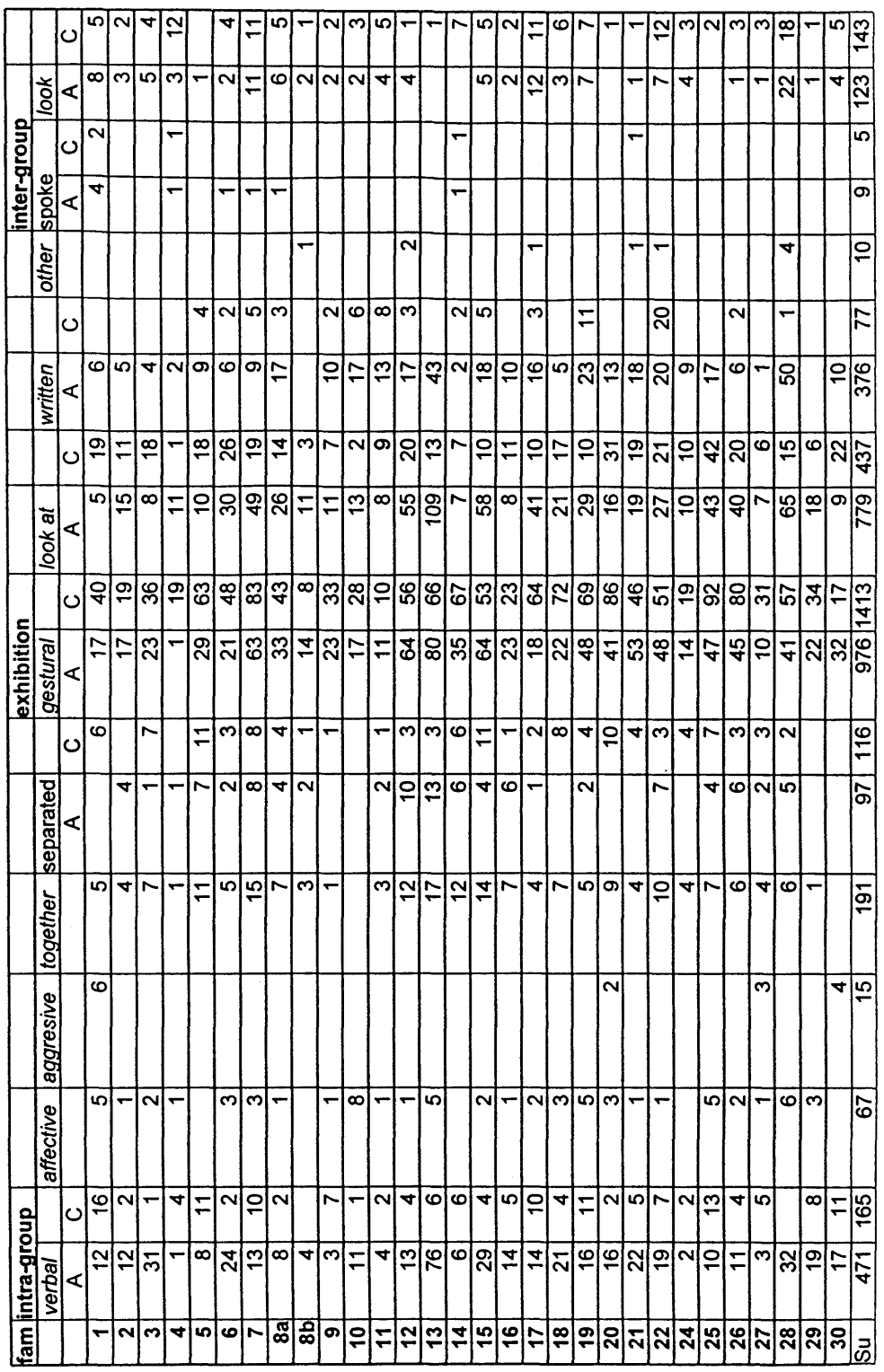


Table B.1

Example of family observation sheet (no. 5) from Xperiment!

Appendix C

Observed behaviour



fam	intra-group						exhibition						inter-group					
	verbal		affective	aggresive	together	separated	gestural		look at		written		other	spoke		look		
	A	C				A	C	A	C	A	C	A		A	C	A	C	
1	12	16	5	6	5		6	17	40	5	19	6		4	2	8	5	
2	12	2	1		4	4		17	19	15	11	5				3	2	
3	31	1	2		7	1	7	23	36	8	18	4				5	4	
4	1	4	1		1	1		1	19	11	1	2		1	1	3	12	
5	8	11			11	7	11	29	63	10	18	9	4			1		
6	24	2	3		5	2	3	21	48	30	26	6	2	1		2	4	
7	13	10	3		15	8	8	63	83	49	19	9	5	1		11	11	
8a	8	2	1		7	4	4	33	43	26	14	17	3	1		6	5	
8b	4				3	2	1	14	8	11	3		1			2	1	
9	3	7	1		1		1	23	33	11	7	10	2			2	2	
10	11	1	8					17	28	13	2	17	6			2	3	
11	4	2	1		3	2	1	11	10	8	9	13	8			4	5	
12	13	4	1		12	10	3	64	56	55	20	17	3	2		4	1	
13	76	6	5		17	13	3	80	66	109	13	43					1	
14	6	6			12	6	6	35	67	7	7	2	2	1	1		7	
15	29	4	2		14	4	11	64	53	58	10	18	5			5	5	
16	14	5	1		7	6	1	23	23	8	11	10				2	2	
17	14	10	2		4	1	2	18	64	41	10	16	3	1		12	11	
18	21	4	3		7		8	22	72	21	17	5				3	6	
19	16	11	5		5	2	4	48	69	29	10	23	11			7	7	
20	16	2	3	2	9		10	41	86	16	31	13					1	
21	22	5	1		4	4	4	53	46	19	19	18		1	1	1	1	
22	19	7	1		10	7	3	48	51	27	21	20	20	1		7	12	
24	2	2			4	4	4	14	19	10	10	9				4	3	
25	10	13	5		7	4	7	47	92	43	42	17					2	
26	11	4	2		6	6	3	45	80	40	20	6	2			1	3	
27	3	5	1	3	4	2	3	10	31	7	6	1				1	3	
28	32		6		6	5	2	41	57	65	15	50	1	4		22	18	
29	19	8	3		1			22	34	18	6					1	1	
30	17	11		4				32	17	9	22	10				4	5	
Su	471	165	67	15	191	97	116	976	1413	779	437	376	77	10	9	5	123	143

Table C.1

Observed behaviour in Xperiment! (A=adults, C=children)

family	intra-group							exhibition							inter-group				explainer									
	verbal		affective	aggresive	together	separated		gestural		look at		written		other	spoke		look		bring		listen to		watch demo		talk to		
	A	C				A	C	A	C	A	C	A	C		A	C	A	C	A	C	A	C	A	C	A	C	
1	10	34	3	2	6	1	6	6	74	8	17		1	2			1	2				1		1	1		2
2	24	7			4	5	3	20	60	31	13	3		3													
3	18	3	2	3	2		3	24	36	6	15	5	1	5	2	1	3	12						2			
4	11	19	2		9	3	7	16	80	35	15	17	1	9		1	9	8									
5	14	2	2		4	4		55	38	52	21	4		1		1											
6	6	29	3			1		14	84	20	40			3	1		1	11				4		1			
7	11	2	9					31	53	22	15	2			1		5	7									
8	10	14	3					20	36	29	19	2	4	2			1	1									
9	7	3	2	1	1	1		24	13	19	11	4		3							2						
10	8	3	1	1	2	3	2	58	72	28	20	3					3	4							2		
11	17	7	3		1	2	1	27	50	31	15	4			2	2	4	6									
12	21	9	7		5	6	2	59	79	47	22	7		2			2				6	5	2	5	1		
13	6							41	49	88	7	8		6				1									
14	7	2	2	4				16	8	37	11						5	3									
15	9	5	5		1	2		4	42	18	18		1	3			2	8				1					
16	52	6	5	2	5	3	3	60	47	71	23	13		5			13	11									
17	12	7	5					33	33	12	14	2			2		2	1							2		
18	40	6	3					30	64	40	21	16	2	8			5	3							1	1	
19	6		4		1		1	19	28	18	5						1	1									
20	17	6	2					30	68	46	31	9	1	5			3	2			2	2	1	1			
21	14	12	1					28	101	24	12	3		3		1	3	7				3	2	3		3	
22	13	1	2					53	47	25	20	2		1			4	6									
23	42	4	8		6		6	28	142	36	35	10	5	11		1	5	11				2			1		
24	22	8	3		2	2		36	30	56	8	5		1	1		8	5			2	3	1	1	1	1	
25	12	2	8	2		1		38	37	24	8														1		
26	22	7	3		7	5	3	36	114	148	51	8	4	12			4	10					1	1			
27	2	3				1			61	3	14			3		34		8									
29	28	7			2	2	1	42	83	73	40	3		2			4	3					1				
Sum	461	208	88	15	58	42	38	848	1629	1047	541	130	20	90	9	41	88	131	0	0	12	21	8	15	10	7	

Table C.2

Observed behaviour in Eureka! (A=adults, C=children)

family	intra-group			affective		aggresive		together	separated		exhibition gestural			look at		written		other	inter-group spoke		look		explainer bring		listen to		watch demo		talk to	
	verbal																													
	A		C						A	C	A		C	A	C	A	C		A	C	A	C	A	C	A	C	A	C	A	C
1		24	7		1			3		2	1	38	22	10	7	5	1								4		2	5	1	
2		9	13		1		1	2			3	21	37	5	16	10	5								3	7		2	6	1	
3		24	17		6							45	48	16	15	9	4	2			1	3			14	10	4	4	14	6	
4		18	3		3							30	28	14	12						3	2			6	6	8	5			
5		10	3								1	29	27	12	11	7		2					1		10	11	3	3	12	3	
6		1								1		1	19	1	5			1			1	12			1	6					
7		2	1		1			4			4	42	82	36	31	4	2				2	6			22	32		1	4	8	3
8		20	26		5			7		5	5	34	89	31	36	4	10	1			2	2			15	16		9	9	7	1
9		6	1		1			1			1	24	26	13	7	3	4				5	1	1		4	5		5	1	4
10		11	2		2							22	17	22	7	2	1				2	1			4	3		3	2	1	
11		19	30									5	25	17	6	1					1		1			1			5	1
12		10	8		1							44	19	18	16	3					3	3			17	10		2	1		1
13		22	4									35	32	6	10	3					1	1			7	5		1	1	8	12
14		10	4					1		1		23	45	36	20	3	2								17	22		1		3	3
15		18	15		1					1		45	44	28	28	8	2				2	2			21	21		2	2	5	1
16		19	14					4			1	42	42	19	12	2	1				2	4	8		11	10		2	3	10	6
17		21	17									37	77	10	11	10	6				1	4			3	5			2		3
18		3	3		3							57	30	25	10	8	3	2							26	13		2	1	2	1
20		9	5		1			2		1		36	40	28	10	5	1				3	4			8	5		2	2	2	2
21		9	6		1			1		1	1	40	50	16	9	2	4				1	2			16	15		3	3	5	3
22		11	5									24	26	29	4	7					1	6			6	3		4	2	1	1
23		8			1			2		1		26	45	29	10	2					2	2			7	8		4	4	4	4
24		5	6		1					1		23	34	16	4	3									4	4		1		2	2
25		7	2							1		14	19	8	2	4	3	1			4	6									
26		7	3									6	14	8	6	2					2	3	1		3	2		2	2		
27		20	7		1					1		34	33	17	5	7	5						1		3	3		1		1	
28		17	23		1			1			1	41	51	19	2	1	1	1					1		6	13		1	2	6	
29		23	10					1				51	88	33	18	7	2						10		6	18				1	1
30		8	2									45	40	28	17	9	4	3			3	4			12	11		4	4	3	
Sum		371	237		31			10		23		15	19	914	1149	550	345	131	62	12		17	9	49	76		2	2	261	269		71	69	107	59

Table C.3

Observed behaviour in the ARC (A=adults, C=children).

Table C.4

Observed behaviour: all museums.

	intra-group							exhibition	
	verbal		affective	aggresive	together	separated		gestural	
	Adults	Children				Adults	Children	Adults	C
Xperiment!	471	165	67	15	191	97	116	976	
Eureka!	461	208	88	15	58	42	38	848	
ARC	371	237	31	10	23	15	19	914	

				inter-group				explainer	
	written		other	spoke		look		bring	
	Adults	Children		Adults	Children	Adults	Children	Adults	C
Xperiment!	376	77	10	9	5	123	143		
Eureka!	130	20	90	9	41	88	131	0	
ARC	131	62	12	17	9	49	76	2	

	watch demo		talk to	
	Adults	Children	Adults	Children
Xperiment!				
Eureka!	8	15	10	7
ARC	71	69	107	59

Appendix D

Questionnaires

Family Questionnaire

Hello. My name is Theano and I'm doing a research project on family visits to hands-on galleries like the ones you've just visited. Could you spare some time to talk to me about your experience in Eureka!? It will take 15 to 20 minutes.

(The questions were slightly different according to the museum.)

Preparing the visit

1. Why did you choose to visit Eureka!?
2. Did you make any preparations before you came? (prompts: discussed anything on your way here; made any sandwiches; did you need to get a map to travel to the Museum; did you invite other people to join in; how did you arrange to meet)
3. What did you plan to do in Eureka! today? (prompt: did you want to do something in particular?)

   if YES, What?

   if NO,When you got to Eureka! what did you do first? Why did you do that? What did you do next, ...?
4. What did you think Eureka! might be like? (question for children) (promt: what did you think you might do here?)
5. What did you expect to get out of your visit:

   - for yourself,
   - for the children?

   (question for adults)
6. Including today's visit, how many times have you been to Eureka! over the last couple of years?

   The Museum visit

7. Do you remember which hands-on exhibits you used in Eureka!? (show photos)
8. Can each of you pick out one or two exhibits you particularly liked? (show photos)
9. What do you think these particular exhibits try to show you?
10. Have you seen anything like that being used at home or elsewhere? (prompt: does this exhibit remind you of anything?)
11. Did you talk to any of the enablers? Did they say anything that it was useful?
12. Did you have any problem in the Museum? (prompts: finding your way to Eureka!; finding your way around; using an exhibit; were the written materials clear such as leaflets, labels, or diagrams; using the facilities?)
13. Do you think you are now more interested in finding out how your body and the world around you work than you were before the visit?
14. How would you describe your experience in Eureka! compared to other museums where you cannot touch things?

Demographic questionnaire

I would be very grateful if you could answer a few questions about yourself.

1. Are you male or female? M / F (circle appropriate response)
2. Which age group do you fit into: (circle appropriate response)

   16-18 19-24 25-34 35-44 45-54 55+
3. Who are you visiting the Museum with today? (circle appropriate responses)
   - with husband / wife
   - with partner
   - with parents
   - with grandparents
   - with grandchildren
   - with children under 15: how many ——— of what age(s) ——
   - with friends
   - with family and friends
   - with other (please specify)————————
4. Are you still in full-time education as a student? Yes/No (circle appropriate response) If NO ...

5. How old were you when you left full-time education as a student?

6. What is or was your occupation (please be as precise as possible)

OK, that's it. Thank you very much for your time, it was a great help.

Bibliography

Addyman, P., 1981, 'Archaeology in York', in Feinstein, C. (ed), *York 1831-1981: 150 Years of Scientific Endeavour and Social Change*, papers published for the British Association for the Advancement of Science 150th Anniversary meeting, York, 53-87.

Addyman, P. and Gaynor, A., 1984, 'The Jorvik Viking Centre: An Experiment in Archaeological Site Interpretation', *The International Journal of Museum Management and Curatorship*, 3, 7-18.

Addyman, P., 1990, 'Reconstruction as Interpretation: The Example of the Jorvik Viking Centre, York', in Gathercole, P. and Lowenthal, D. (eds), *The Politics of the Past, One World Archaeology*, Unwin Hyman, London, 257-264.

Aldous, J., 1995, 'The Views of Grandparents in Intergenerational Context', *Journal of Family Issues*, Vol.16 No.1, Sage Publications, Inc., 104-122.

Archaeological Resource Centre, 1993, *Staff Training Manual*, unpublished document.

Archaeological Resource Centre, 1996, *Exit Research*, unpublished report.

Audio Visual Handbook, nd, The Museum Development Company, UK, 110.

Bicknell, S. and Farmelo, G.(eds), 1993, *Museum Visitor Studies in the 90s*, Science Museum, London, 7-10.

Bitgood, S., Serrell, B. and Thompson, D., 1994, 'The Impact of Informal Education on Visitors to Museums', in Crane, V., Nicholson, H., Chen, M. and Bitgood, S. (eds), *Informal Science Learning: What the Research Says About Television, Science Museums, and Community-Based Projects*, Research Communications Ltd., USA.

Black, L.A., 1990, 'Applying Learning Theory in the Development of a Museum Learning Environment', in ASTC, *What Research Says About Learning in Science Museums*, Washington DC, 23-25.

Blud, L.M., 1990, 'Social Interaction and Learning Among Family Groups Visiting a Museum', *Museum Management and Curatorship*, 9, 43-51.

Borun, M. et al, 1995, 'Family in Museums: A Bibliographic Review', *Curator*, 38/4, 262-270.

Borun, M. et al, 1996, 'Families Are Learning in Science Museums', *Curator*, 39/2, 123-138.

Bradburne, J., 1993a, 'Going Public: Science Museums, Debate and Democracy', in Bradburne, J. and Janousek, I. (eds), *Planning Science Museums for the New Europe*, seminar proceedings, Narodni Technicke Muzeum, Prague, UNESCO, 83-94.

Bradburne, J., 1993b, 'Introduction: Bridges to the Future', in Bradburne, J. and Janousek, I. (eds), *Planning Science Museums for the New Europe*, seminar proceedings, Narodni Technicke Muzeum, Prague, UNESCO, 10-18.

Briggs, P., 1989, 'The Variety of Hands-On Centres' in Quin, M. (ed), *Sharing Science: Issues in the Development of Interactive Science and Technology Centres*, Nuffield Foundation/COPUS, London, 10-11.

Brisbane, M. and Wood, J., 1996, *A Future for our Past?*, English Heritage, Colchester.

Butler, S., 1992, *Science and Technology Museums*, Leicester University Press.

CBA, 1982a, *Archaeology in the Classroom*, Vineyard Press Ltd, Colchester, UK.

CBA, 1982b, *Archaeology and Science*, Vineyard Press Ltd, Colchester, UK.

CBA, 1985, 'Archaeological Scholarship for Young People', *Newsletter*, June, vol 9, No 4, 49.

CBA, 1986, 'Archaeological Resource Centre for York', *Newsletter*, January, vol 9, No 9, 78.

CBA, 1995, Report No 44 for the year ended July 1994, 14-17.

Chabay, I., 1988, 'Flowcommotion and Crystal Spider: Translating Scientific Concepts into Hands-On Learning Devices' in Heltne, P. and Marquardt, L. (eds), *Science Learning in the Informal Setting*, symposium proceedings, The Chicago Academy of Science, Chicago, Illinois, 45-58.

Cleaver, J., 1988, *Doing Children's Museums*, Williamson Publishing Co, USA.

Coe, J.C., 1988, 'Children's Drawings: New Tool for Zoo Exhibit Evaluation' in Bitgood, S., Roper, J.T., Benefield, Jr. and Benefield, A., *Visitor Studies-1988: Theory, Research and Practice*, vol.2, 87-100.

Cohen, L. and Manion, L., 1994, *Research Methods in Education*, fourth edition, Routledge, 252-270.

Cone, C.A., 1978, 'Space, Time, and Family Interaction: Visitor Behaviour at the Science Museum of Minnesota', *Curator*, 21/3, 245-258.

Congreve, J., 1996, 'Patterns, Symbols and Pictorial Truth', in Jones, H., Raby, R. and Vicars, D., (eds), *Proceedings of the 14th Annual Conference*, Eurographics UK Chapter, Imperial College, London, 153-164.

Copeland, A. and White, K., 1991, *Studding Families*, Applied Social Research Series, Vol. 27, SAGE Publications.

Csikszentmihalyi, M., 1988, 'Human Behavior and the Science Centre', in Heltne, P.G. and Marquardt, L.A., *Science Learning in the Informal Setting*, symposium proceedings, The Chicago Academy of Sciences, Chicago, Illinois.

Csikszentmihalyi, M. and Robinson, R., 1990, *The Art of Seeing: An Interpretation of the Aesthetic Encounter*, J. Paul Getty Museum and Getty Center for Education in the Arts, California.

Csikszentmihalyi, M. and Hermanson, K., 1995, 'Intrinsic Motivation in Museums: Why Does One Want to Learn?', in Falk, J. and Dierking, L. (eds), *Public Institutions of Personal Learning: Establishing a Research Agenda*, American Association of Museums, Technical Information Service, 67-78.

Danilov, V., 1976, 'European Science and Technology Museums', *Museum News*, July/August, 34-37 & 71-72.

Davis, S., 1994, *By Popular Demand: A Strategic Analysis of the Market Potential for Museums and Art Galleries in the UK*, Museums and Galleries Commission, England.

Department of National Heritage, 1996, *Access Case Studies*, Pieda plc, Planning, Economic and Development Consultants, UK.

Diamond, J., 1986, 'The Behaviour of Family Groups in Science Museums', *Curator*, 29/2, 139-154.

Dierking, L.D., 1992, 'The Family Museum Experience: Implications from Research', in *Museum Education Roundtable - Patterns in Practice*, Washington DC, 215-221.

Dierking, L.D., 1992, 'A Historical Survey of Learning Theory', *The Audience in Exhibition Development*, American Association of Museums, Washington DC, 24-28.

Durant, J., 1993, 'Rising to the Challenge', *Museums Journal*, October, 26-27.

Durrans, B., 1995, 'The Future of the Other: Changing Cultures on Display in Ethnographic Museums', in Lumeley, R. (ed), *The Museum Time Machine*, Routledge, Great Britain, 144-169.

Dyson, A.H., 1990, 'Symbol Makers, Symbol Weavers: How Children Link Play, Pictures, and Print', *Young Children*, January, 50-57.

Eason, L. and Linn, 1976, 'Evaluation of the Effectiveness of Participatory Exhibits', *Curator*, 19/1, 45-62.

Educational Facilities Laboratories, 1975, *Hands-On Museums: Partners in Learning*, EFL, New York.

Edeiken, L., 1992, 'Children's Museums: The Serious Business of Wonder, Play, and Learning', *Curator*, 35/1, 21-27.

Elliot, F.R., 1986, *The Family: Change or Continuity?*, MacMillan.

Eureka!, 1990, *Living and Working Together; Me and My Body; Invent, Create, Communicate, the Recycling Centre, the Eureka! Maths Trail; Orientation Area*, unpublished document.

Eureka!, 1992, *Finding Out about the Exhibition*, unpublished document.

Eureka!, 1993a, *The Education Team's Short Term Strategy: September 1993-January 1994*, unpublished documents.

Eureka!, 1993b, *Eureka! Education and Interpretation Plan*, unpublished document.

Eureka!, 1993c, *Eureka! The Museum for Children Evaluation Plan*, unpublished document.

Eureka!, 1993d, *Under 5's Area*, unpublished document.

Eureka!, 1993e, *Evaluation of Exhibits; Hello! Is Anyone There?*, unpublished documents.

Eureka!, 1993f, *Summary of the Demographic Survey of Visitors: Summer 1993*, unpublished document.

Eureka!, 1994a, *Annual Visitor Survey 1994*, unpublished document.

Eureka!, 1994b, *Eureka! Policy for Environmental Excellence*, unpublished document.

Falk, J., 1991, 'Analysis of the Behavior of Family Visitors in Natural History Museums', *Curator*, 34/1, 44-50.

Falk, J. and Dierking, L., 1992, *The Museum Experience*, Whalesback Books, Washington DC.

Falk, J. and Dierking, L., 1995, 'Establishing a Long-Term Learning Research Agenda for Museums, in Falk, J. and Dierking, L. (eds), *Public Institutions of Personal Learning: Establishing a Research Agenda*, American Association of Museums, Technical Information Service, 31-34.

Falk, J. et al, 1995, 'How Should we Investigate Learning in Museums?: Research Questions and Project Designs' in Falk, J. and Dierking, L. (eds), *Public Institutions of Personal Learning: Establishing a Research Agenda*, American Association of Museums, Technical Information Service, 23-30.

Faria, M., 1994, *Amusement without Excess and Knowledge without Fatigue: Modern Transformations of the Museum Experience*, unpublished doctorate thesis, University of Leicester, England.

Faure, E. et al, 1980, 'Elements for Contemporary Strategies: Innovations and Search for Alternatives', in Reedy, S. and Woodhead, M. (eds), *Family, Work and Education*, The Open University, 351-379.

Faure, E., 1972, *Learning to Be - The World of Education Today and Tomorrow*, UNESCO, Paris.

Fayard, P., 1992, 'Let's stop Persecuting People Who Don't Think Like Galileo!', *Public Understanding of Science*, 1, January, UK, 15-16.

Fielding, N., and Lee, R., (ed.), 1991, *Using Computers in Qualitative Research*, Sage.

Firstone J. and Shelton, B.A., 1988, 'An Estimation of the Effects of Women's Work on Available Leisure Time', *Journal of Family Issues*, Vol.9, No.4, Sage Publications, Inc., 478-495.

Frankfort-Nachmias, C. and Nachmias, D., 1992, *Research Methods in the Social Sciences*, fourth edition, Edward Arnold.

Freeman, R., 1989, *The Discovery Gallery:Discovery Learning in the Museum*, ROM, Canada.

Gardner, H., 1973, *The Arts and Human Development: A Psychological Study of the Artistic Process*, John Wiley and Sons, Inc., USA.

Gardner, H., 1985, *Frames of Mind: The Theory of Multiple Intelligences*, BasicBooks, NY.

Gardner, H., 1988, 'Challenges For Museum: Howard Gardner's Theory of Multiple Intelligences', *Hand to Hand Children's Museum Network*, Vol.2 No.4, 1,4-5,7.

Gardner, H, 1991, *The Unschooled Mind: How Children Think and How Schools Should Teach*, BasicBooks, NY.

Gardner, H, 1993, *Frames of Mind: The Theory in Practice*, BasicBooks, NY.

Gelles, R., 1995, *Contemporary Families: A Sociological View*, Sage Publications, USA.

Graham, B., 1996, 'Not a Show about New Technology, a Show about Interaction', in Graham, B. (ed), *Serious Games: Art, Interaction, Technology*, exhibition catalogue, Barbican Art Gallery and Tyne & Wear Museums, Corporation of London, 6-9.

Gramling, R. and Forsyth, C., 1987, 'Work Scheduling and Family Interaction: A Theoretical Perspective', *Journal of Family Issues*, Vol.8 No.2, Sage Publications, Inc., 163-175.

Greene, P., 1989, 'Xperiment! The Role of a Hands-On Gallery in the Museum of Science and Industry in Manchester' in Quin, M. (ed), *Sharing Science: Issues in the Development of Interactive Science and Technology Centres*, Nuffield Foundation/COPUS, London, 11-12.

Greene, P. and Porter, G., 1992, 'The Museum of Science and Industry in Manchester: The Local and Historical Context', in Durant, J. (ed), *Museum and the Public Understanding of Science*, Science Museum, London, 94-96.

Greene, P., 1996, 'The Museum of Science and Industry in Manchester and the Transformation of an Historic Industrial City', *conference proceedings of ICOM-CIMUSET conference*, Museum of Science and Industry in Manchester, 3-7.

Gregory, R., 1989, 'Turning Minds on to Science by Hands-On Exploration: The Nature and Potential of the Hands-On Medium' in Quin, M. (ed), *Sharing Science: Issues in the Development of Interactive Science and Technology Centres*, Nuffield Foundation/COPUS, London, 1-9.

Gregory, R., 1990, 'Hands-On Science: Its Contribution to Physics and Education', *Physics Education*, vol 25, UK, 233.

Grinell, S., 1992, 'Starting with the Mission', in Grinell, S. (ed), *A New Place for Learning Science: Starting and Running a Science Centre*, Association of Science-Technology Centres, Washington DC, 9-16.

Gubrium, J.F. and Holstein, J.A., 1987, 'The Private Image: Experimential Location and Method in Family Studies', *Journal of Marriage and the Family*, Vol.49 No.4, National Council on Family Relations, 773-786.

Gurian, E., 1981, 'Adult Learning at Children's Museum of Boston' in Collins, Z., *Museums, Adults and the Humanities: A Guide for Educational Programming*, American Association of Museums, Washington DC, 271-290.

Harland et al, 1996, *Attitudes to Participation in the Arts, Heritage, Broadcasting and Sport: A Review of Recent Research*, a report for the Department of National Heritage from the National Foundation for Educational Research, UK.

Harvey, L., and Macdonald, M., 1993, *Doing Sociology: A Practical Introduction*, MacMillan.

Hein, G., 1991, 'The Significance of Constructivism for Museum Education', *Proceedings of ICOM/CECA Annual Conference*, Jerusalem 1991, ICOM, 89-94.

Hein, H., 1990, *The Exploratorium: The Museum as Laboratory*, Smithsonian Institution.

Hiemstra, R., 1981, 'The Implications of Lifelong Learning', in Collins, Z. (ed), *Museums, Adults and the Humanities, American Association of Museums*, Washington DC, 131-146.

Hilke, D.D., 1988, 'Strategies for Family Learning in Museums' in Bitgood, S., Roper, J. and Jr. and A., Benefield (eds), *Visitor Research 1988: Theory, Research and Practice*, Center for Social Design, US.

Hilke, D.D., 1989, 'The Family as a Learning System: An Observational Study of Families in Museums', in Butler, B. and Sussman, M. (eds), *Museum Visits and Activities for Family Life Enrichment*, The Haworth Press, 101-130.

Hilke, D. and Balling, J., 1985, *The Family as a Learning System: An Observational Study of Families in Museums*, Smithsonian Institution Press, Washington DC.

Hill, M. S., 1988, 'Marital Stability and Spouses' Shared Time: A Multidisciplinary Hypothesis, *Journal of Family Issues*, Vol.9 No.4, Sage Publications, Inc., 427-451.

Hood, M., 1989, 'Leisure Criteria of Family Participation and Non-participation in Museums', in Butler, B. and Sussman, M., (ed), *Museum Visits and Activities for Family Life Enrichment*, The Haworth Press, 151-167.

Hooper-Greehill, E., 1995, 'Counting Visitors or Visitors who Count?' in Lumley, R. (ed), *The Museum Time Machine*, Routledge, Great Britain, 213-232.

Hooper-Greenhill, E., 1997, 'Museum Learners as Post-modernists: Contextualising Constructivism', *Journal of Education in Museums*, No18, 1-4.

Jones, A. et al, 1990, *Archaeological Resource Centre*, unpublished document.

Jones, A., 1994, *Extending the Audience for Archaeology: The Archaeological Resource Centre in York*, UK, unpublished paper.

Jones, A., 1995, 'Integrating School Visits, Tourists and the Community at the Archaeological Resource Centre, York, UK' in Hooper-Greenhill, (ed), *Museum, Media, Message*, Routledge, UK, 156-164.

Jensen, K., and Jankowski, N., (ed.), 1991, *A Handbook of Qualitative Methodologies for Mass Communication Research*, Routledge.

Jorgensen, D., 1989, *Participant Observation: A Methodology for Human Studies*, Applied Social Research Methods Series, Vol. 15, Sage.

Kadow, E., 1990, 'Design of the Archaeological Resource Centre', *Interim*, Archaeology in York, vol 15, No 1, UK, 34-39.

Katz, H. and Katz, M., 1965, *Museums USA: A History and Guide*, Doubleday and Co Inc, New York, 209-221.

Klotz, H., 1996, 'Video Art', in *Guggenheim Museum SoHo, Mediascape*, exhibition catalogue, the Solomon R. Guggenheim Foundation, New York, 8-11.

Knaggs, M., 1992, 'St Saviour's Parish in 1851', *Interim*, Archaeology in York, vol 17, No 4, UK, 6-14.

Knowles, M.S., 1981, 'The Future of Lifelong Learning' in Collins, Z. (ed), *Museums, Adults and the Humanities*, AAM, Washington DC, 131-143.

Kropf, M.B., 1992, 'The Family Museum Experience: A Review of the Literature', in *Museum Education Roundtable–Patterns in Practice*, Washington DC, 223-229.

Kyriakou, C., 1992, 'York Archaeological Trust's Archive', *Interim*, Archaeology in York, vol 17, No 4, UK, 22-24.

LaVilla-Hevelin, J.S., 1989, 'Family Learning in Museums', in Butler, B. and Sussman, M., (ed), *Museum Visits and Activities for Family Life Enrichment*, The Haworth Press, 87-100.

Levy-Leblond, J., 1992a, 'The Museum of Technology in Context' in Bradburne, J. and Janousek, I. (eds), *Planning Science Museums for the New Europe*, seminar proceedings, Narodni Technicke Muzeum, Prague, UNESCO, 97-103.

Levy-Leblond, J., 1992b, 'About Misunderstandings about Misunderstandings', *Public Understanding of Science*, January, 1, 17-21.

Lewin, A., 1989, 'Children's Museums: A Structure for Family Learning' in Butter, B. and Sussman, M. (eds), *Museum Visits and Activities for Family Life Enrichment*, The Haworth Press, New York, 51-74.

Lewis, P., 1993, 'Touch and Go', *Museums Journal*, February, 33-34.

Linton, J. and Young, G., 1992, 'A Survey of Visitors at an Art Gallery, Cultural History Museum, Science Centre, and Zoo', *ILVS Review*, Vol.2 No.2, 239-259.

Lumeley, R. (ed), 1993, *The Museum Time Machine*, Routledge, Great Britain, 1-24.

Macdonald, S., 1992, 'Cultural Imagining Among Museum Visitors: A Case Study', *Museum Management and Curatorship*, Butterworth-Heinemann Ltd, 11, 401-409.

Macdonald, S., 1993, 'Museum Visiting', Series: Representations: Places and Identities, *Sociology and Social Anthropology Working Papers*, No 1, Keele University.

Macdonald, S., 1995, 'Consuming Science: Public Knowledge and the Dispersed Politics of Reception Among Museum Visitors', *Media, Culture and Society*, Sage, vol.17, 13-29

Macdonald, S. and Silverstone, R., 1992, 'Science on Display: The Representation of Scientific Controversy in Museum Exhibitions', *Public Understanding of Science*, IOP Publishing Ltd and The Science Museum, 69-87.

Mackenzie, R. and Stone, P., 1990, 'Introduction: The Concept of the Excluded Past', in Stone, P. and Mackenzie, R. (eds), *The Excluded Past: Archaeology in Education*, Unwin Hyman, London, 1-14.

Market Research Society, 1991, *Occupation Groupings: A Job Dictionary*, Twentieth Century Press Ltd, Bishop's Stortford, London.

Mason, J., *Qualitative Researching*, Sage Publications, Great Britain.

McManus, P., 1987, 'It's the Company You Keep...The Determination of Learning-Related Behaviour in a Science Museum', *The International Journal of Museum Management and Curatorship*, Butterwoth and Co Publishers, Ltd., 6, 263-270.

McManus, P.M., 1988, 'Good Companions - More on the Social Determination of Learning-Related Behaviour in a Science Museum', *The International Journal of Museum Management and Curatorship*, 7, 37-44.

McManus, P., 1992, 'Topics in Museums and Science Education', *Studies in Science Education*, vol 20, UK, 157-182.

McNamara, P., 1990, 'Trying it Out', in ASTC, *What Research Says About Learning in Science Museums*, Washington DC, 13-15.

McNeill, P., 1985, *Research Methods*, second edition, Routledge.

Meredieu, F., 1981, *To Padiko Shedio*, Greek edition based on Meredieu, F., 1974, *Le Dessin d' Enfant*, Editions Universitaires, France.

Merriman, N., 1991, *Beyond the Glass Case*, Leicester University Press.

Mezirow, J., 1980, 'Perspective Transformation', in Reedy, S. and Woodhead, M., *Family, Work and Education*, The Open University, 270-278.

Miles, M. and Huberman, M., 1994, *An Expanded Sourcebook: Qualitative Data Analysis*, Sage.

Miles, I. and Thomas, 1993, 'User Resistance to New Interactive Media: Participants, Processes and Paradigms', in Bauer, M. (ed), *Resistance to New Technology: Nuclear Power, Information Technology and Biotechnology*, conference proceedings, Science Museum, London, Cambridge University Press, 255-275.

Millard, J., 1994, 'Hands-On Art', *Museum Visitor*, 49-54.

Miller, J., 1992, 'Toward a Scientific Understanding of the Public Understanding of Science and Technology', *Public Understanding of Science*, January, 1, UK, 23-26.

Morgan, D., 1988, 'Socialisation and the Family', in Woodhead, M. and McGrath, A.,(ed), *Family, School and Society*, The Open University, 28-55.

Moll, L., 1995, 'Introduction', in Moll, L., (ed), *Vygotsky and Education: Instructional Implications and Applications of Sociohistorical Psychology*, Cambridge University Press, USA, 1-30.

Morris, C., 1990, 'Importing Hands-On Science into Schools: The Light Works Van Programme', *Physics Education*, vol 25, UK, 263-266.

Moussouri, T., 1993, *Children's Drawings: An Indicative Tool of the Understanding of Space in the Museum*, unpublished masters dissertation, University of Leicester.

Moussouri, 1997, 'The Use of Children's Drawings as an Evaluation Tool in the Museum', *Museological Review*, 4, 40-50.

Museum of Science and Industry in Manchester, 1986, *Science and Technology Centre*, unpublished document.

Museum of Science and Industry in Manchester, 1992a, *The National Gas Gallery*, summative evaluation report.

Museum of Science and Industry in Manchester, 1992b, *The Flight Exhibition Report:Evaluation of Proposed Ideas*, front end evaluation report.

Museum of Science and Industry in Manchester, 1996, *Meeting the Challenge*, annual report 1995-1996.

Office of Population Censuses and Surveys (OPCS), 1991, *Marriage and Divorce Statistics*, Series FM2 No.19, HMSO, London.

Orna, E., 1993, 'Interaction: Liberation or Exploitation?', *Museums Journal*, February, 27-28.

Owston, T., 1992, 'The Local History Project', Archaeology in York, *Interim*, vol 17, No 3, 15-20.

Parr, A., 1960, 'Why Children's Museums?', *Curator*, III/3, 217-236.

Piaget, J., 1962, *Play, Dreams, and Imitation*, Norton, NY.

Pitman-Gelles, B., 1981, *Museums, Magic and Children*, Association of Science Technology Centres, Washington DC

Pizzey, S. (ed), 1987, *Interactive Science and Technology Centres*, Science Projects Publishing, UK.

Porter, G., 1996, 'Shaping Museums from the Outside In', *Conference Proceedings of ICOM-CIMUSET Conference*, Museum of Science and Industry in Manchester, 8-13.

Quin, M., 1990, 'What is Hands-On Science, and Where Can I Find it?', *Physics Education*, vol. 25, UK, 243-246.

Reedy, S. and Woodhead, M., 1980, *Family, Work and Education*, the Open University.

Rosenfeld, S.B., 1981, *Informal Learning in Zoos: Naturalistic Studies of Family Groups*, unpublished PhD thesis, University of California, Berkeley.

Scott, J. et al, 1993/94, 'The Family Way', in Jowell, R., Brooks, L., Dowds, L. and Ahrendt, D., (eds), *International Social Attitudes*, the 10th BSA report, Social and Community Planning Research, 23-47.

Serrell, B., 1990, 'Introduction', in ASTC, *What Research Says About Learning in Science Museums*, Washington DC.

Silverman, D., 1993, *Interpreting Qualitative Data: Methods for Analysing Talk, Text, and Interaction*, Sage Publications, Great Britain.

Steffe, L.P. and Wiegel, H.G., 1994, 'Cognitive Play and Mathematical Learning in Computer Microworlds', *Educational Studies in Mathematics*, 26, Kluwer Academy Publishers, Netherlands, 111-134.

Stevenson, A. and Bryden, M., 1991, 'The National Museums of Schotland's 1990 Discovery Room: An Evaluation', *Museum Management and Curatorship*, 10, 24-36.

Stevenson, J., 1991, 'The Long-Term Impact of Interactive Exhibits', *International Journal of Science Education*, vol 13, no 5, 521-531.

Steuert, P., Jenness, A. and Jones-Rizzi, J., 1993, *Opening the Museum: Towards a More Inclusive Institution*, The Children's Museum, Boston.

Strauss, A. and Corbin, J., 1990, *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage.

Strauss, A. and Corbin, J., 1994, 'Grounded Theory Methodology: An Overview', in Denzin, N. and Lincoln, Y., (eds), *Handbook of Qualitative Research*, Sage, 273-285.

Sund, R.B., 1976, 'Piaget's Theory of Cognitive Development', *Piaget for Educators*, Columbus, OH:Merrill Publishing Company, 4-13.

Thomas, G., 1992, 'How Eureka! The Children's Museum Responds to Visitors' Needs' in Durant, J., *Museums and the Public Understanding of Science*, Science Museum/COPUS, 88-93.

Times Educational Supplement, 1992, 'Down the Yellow Brick Road', *The Times*, 3rd July, UK.

Vasta, R., Haith, M. and Miller, S., 1992, *Child Psychology - The Modern Science*, John Wiley and Sons, Inc.

Walsall Museum and Art Gallery, 1996, *"...Just Like Drawing in your Dinner..."*, Museum booklet.

Wetton, J., 1996, 'Interpreting Black Box Technology: Pointers from Evaluation Studies', *Conference Proceedings of ICOM-CIMUSET Conference*, Museum of Science and Industry in Manchester, 14-16.

Williams, M., 1990, 'Understanding is Both Possible and Amusing', *Physics Education*, vol 25, UK, 253-257.

Waterfall, M., and Grusin, S., 1989, *Where is the Me in the Museum: Going to Museums with Children*, Vandamere Press, US.

Weitzman, E. and Miles, M., 1995, *A Software Sourcebook: Computer Programs for Qualitative Data Analysis*, Sage.

White, J. and Bary, S., 1984, *Science Education for Families in Informal Learning Settings: An Evaluation of the HERBlab Project*, Office of Education, National Zoological Park, Smithsonian Institution, Washington DC, Technical Report, no.86-45.

White, J., 1990, 'What Have We Discovered about Discovery Rooms?', in ASTC, *What Research Says About Learning in Science Museums*, Washington DC, 7-9.

Woodhead, M., Family, *Work and Education*, The Open University, 8-22.

Worsley, P., 1980, 'The Family in Industrial Society', in Reedy, S. and

Wynne, B., 1992, 'Public Understanding of Science Research: New Horizons or Hall of Mirrors?', *Public Understanding of Science*, January, 1, UK, 37-43.

Yin, R., 1994, *Case Study Research: Design and Methods*, Second edition, Applied Social Research Methods Series, Vol. 5, Sage.

Yorath, J., 1995, 'Science and Design/Technology', in Yorath J. (ed), *Science and Technology in Museums*, South Eastern Museum Service, 4.

York Archaeological Trust, 1990, *1989-1990: 18th Annual Report.*

Interviews

Jones, A., 11/1994: personal communication

Leigh, R., 1/1995: personal communication

Mumford, S., 12/1994: personal communication

Porter, G., 11/1994: personal communication