April 29, 2005

Mrs. Bridget Clifford
Senior Curator (Tower Library)
Royal Armouries, HM Tower of London
London
EC3N 4AB
United Kingdom

Dear Mrs. Clifford:

Enclosed is our report entitled **"Hands on History" at HM Tower of London**. It was written at the Tower of London facilities during the period March 14 through April 29, 2005. Preliminary work was completed in Worcester, Massachusetts, prior to our arrival in London. Copies of this report are simultaneously being submitted to Professors FitzPatrick and Sanbonmatsu for evaluation. Upon faculty review, the original copy of this report will be catalogued in the Gordon Library at Worcester Polytechnic Institute. We appreciate the time and assistance that you and your staff have devoted to us.

Sincerely,

Justin Clark _____

Robert Cutler _____

Jonathan Sikes _____

Kevin Toomey _____

# "Hands on History" at HM Tower of London

A Report Submitted to:

Professor Malcolm FitzPatrick
Professor John Sanbonmatsu

London, Project Centre

By

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In Cooperation With

Mrs. Bridget Clifford, Curator; Tower of London

Royal Armouries Education Service
Tower of London

April 28, 2005

This project report is submitted in partial fulfillment of the degree requirements of Worcester Polytechnic Institute. The views and opinions expressed herein are those of the authors and do not necessarily reflect the positions or opinions of HM Tower of London or Worcester Polytechnic Institute.

This report is the product of an educational program, and is intended to serve as partial documentation for the evaluation of academic achievement. The reader should not construe the report as a working document.

# Abstract

This report, prepared for the Royal Armouries Education Staff, evaluates the educational quality of their “Hands on History” exhibit and its appeal to various groups. This was achieved through surveys and observation of visitors and interviews with Tower staff. Results show that hands-on methods are more effective at keeping visitors at an exhibit for extended period; hands-on exhibits should be incorporated into future exhibition designs.

# Authorship Page

This project involved a great deal of collecting data, analyzing data, and writing. Without each team members' considerable contribution to the report it would have been a daunting task. The positive team chemistry throughout was principally responsible for the success of the project. We all had a hand in the writing all of the sections of this report. One person may have written a preliminary draft after a group discussion of the subject matter; then, the other group members read that draft and edited or reword the text as necessary. Each member of the team has contributed to each aspect of the paper; therefore, there was no appropriate method by which to divide up the work and determine which team members have completed specific sections. The culmination of our writing and ideas created the final draft. Each one of us read and marked a printed copy of the report in its entirety to make sure that we were all comfortable with the printed version. We feel that each team member has contributed to this report to the best of their ability and believe that the equal division of work throughout the project has been excellently managed and carried out.

# Acknowledgments

For their patience, generosity and assistance, we would like to thank our project sponsor, Bridget Clifford, Mandy Martin-Smith, Irene Davies, Liz Denton, Laura Drake, and Mark Folwell. We would also like to thank the entire WPI IGSD department.

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# Executive Summary

The Educational and Curatorial Staff for the Royal Armouries at HM Tower of London aims to display their impressive wealth of historical artifacts and information through a hands-on approach to learning. A temporary exhibition, entitled "Hands on History," was created to commemorate the Royal Armouries past initiatives by incorporating more interactive methods. Director and Sponsor Bridget Clifford clearly defined the problem statement: "The Educational Service (which operates in HM Tower of London Museum) does not know the effectiveness of its Thirty Years of Hands on Learning exhibit." The purpose of this project was to evaluate the success of the exhibition's display methods in terms of interest and educational value.

This evaluation was based on research of the functions and history of museum display methods, visitor demographics, reasons for visiting the Museum and an understanding of survey psychology and learning styles. Specifically, this study performed a comprehensive evaluation of the "Hands on History" exhibit on the third floor of the White Tower, determining the most effective display types, to whom these exhibits were most appealing, and whether the goals of the Education Staff were met. This analysis can be used to design more effective exhibits in the future and serve as a basis for evaluating future exhibits.

Several means were employed to evaluate the exhibit that took into account as many variables and points of view as possible. Four methods were used to measure visitor response to the exhibits and their various conditions; (1) a review of the visitors' comment book; (2) the surreptitious following of selected visitors or groups as they proceeded through the exhibition, noting their extent of interaction and how long they spent at each sub-exhibit (this is known as "ant-trail observations"); (3) the distribution of questionnaires to visitors; and (4) a physical count of the visitors traveling through the exhibition..

To avoid repetition, the bulk of data is confined to appendices and only essential examples are displayed in the body of the report. The products of our data collection vary in magnitude and importance, and are reflected in the strength of our conclusions. Most conclusions are drawn from an amalgamation of all four sources of visitor data and are supplemented with various other sources such as museum staff interviews and visits to other museums with hands-on exhibits.

Ant-trails corroborated the validity and reliability of the questionnaires and allowed us to quantitatively analyze data that was primarily based on observational hypotheses. Results from the data suggest several worthwhile changes that can be made to the layout of the exhibit to improve flow and time efficiency for visitors. By melding these analyses, the team was able to

determine which types of exhibits are the most effective, where they might be placed physically on the exhibit floor and how they can be made to compliment each other in order to facilitate visitor learning and enjoyment. While these conclusions suggest certain methods of achieving a more effective exhibition, they are certainly not the only ways, nor are they impervious to practical considerations that mitigate the ability of exhibit designers to implement these methods. Nevertheless, our investigation identifies the present strong points and the problems that exist in the “Hands on History” exhibition.

# 1. Introduction

This report was prepared by members of the Worcester Polytechnic Institute London Project Centre. The relationship of the Centre to the Tower of London and the relevance of the topic to the Tower of London are presented in Appendix A.

Museums fill multiple roles in modern society. They exist to maintain and preserve history and artifacts. (Roberts, 1997, p. 24) They also educate the public about that history. Recently, museums have begun a movement to create exhibits in which the public can interact audibly, visually, and tactilely. The shift from bland static exhibits to lively engaging experiences has been supported and inspired by museums, educational organizations, and the public alike.

The Royal Armouries has made use of interactive approaches by implementing several hands-on exhibits at Her Majesty's Tower of London [TOL]. Over the past several years the TOL has experimented with innovative techniques in the hopes of accommodating a variety of learning styles and raising interest level in the history presented. The Royal Armouries wanted to determine how effective these new exhibits have been with regards to interest level and education. (Educational Service, 2004, p. 1)

Museums benefit from the educational quality of interactive exhibits; however an appropriate, standardized format for creating them does not exist. Museums also experiment with new techniques to improve their exhibit quality. Most, however, lack the necessary research methods required to evaluate their methods. Previous research completed by educational organizations has focused primarily on teacher response and is a very limited resource. (Clifford, 2005) Adequate and representative analysis of the general population, and moreover, the educational quality of interactive exhibits was completed through this IQP.

There have been few evaluations in place for the majority of the exhibits in the Museum. In the recent past, the Royal Armouries, with assistance from WPI IQP students, has executed a series of analyses regarding other exhibits. Until the study described in this report, HM Tower of London had no gauge for the effectiveness of its "Hands on History" exhibit in terms of educational quality and interest for a variety of demographic groups. Prior IQP projects have not developed a general solution for rating interactive exhibits. (Billings, 2004) The Tower of London and the Royal Armouries Educational Services were therefore interested in obtaining user feedback from its visitors to generate a consistent metric to evaluate and analyze the effectiveness of the "Hands on History" exhibit and museum exhibits. Our group gathered this data and presented it in an organized and logical manner.

The information about this exhibit was presented to the Royal Armouries Education Centre to determine whether or not its goals have been met satisfactorily. Our research intended to provide the sponsor with as much information and feedback as possible. With the data and analysis organized in various manners, the sponsor will be able to make an informed decision on the efficacy of its exhibits. This information will allow the Tower of London to construct effective future exhibits.

# 2. Background

This background chapter introduces the reader to the topics that are important to fully understand this project. The chapter covers a brief history of the Tower of London and the role of the Education Service within the Royal Armouries. This chapter also covers the exhibit being examined in this project including pictures and a general description of the exhibit's layout, as well as the objectives of the Educational Centre. The background chapter will give an overview of museums in general, their role in society and the ways in which they display their exhibits. Finally, this chapter touches upon the many ways in which people learn and some of the factors that affect learning.

## *2.1 Brief History of the Tower*

The Tower of London (which takes its name from the first building constructed on the site—the White Tower) was commissioned late in the 11th century by William the Conqueror. (Tower of London Education Centre, 2004) When William had the Tower built, he had many intentions for the role it would play. The Tower was primarily meant as a symbol for the new Norman reign and the new monarchy. It also had the major, albeit secondary roles of physically dominating the cityscape and separating his invading Norman forces from the local Anglo-Saxon inhabitants. Finally, like all castles, it could also protect vital personnel in the event of a foreign invasion. (Tower of London Education Centre, 2004) The first incarnation of the Tower can be seen in Figure 2 - 1 below, circa 1100 A.D. Several features, such as the moat and high walls, reveal clues about its intended roles.

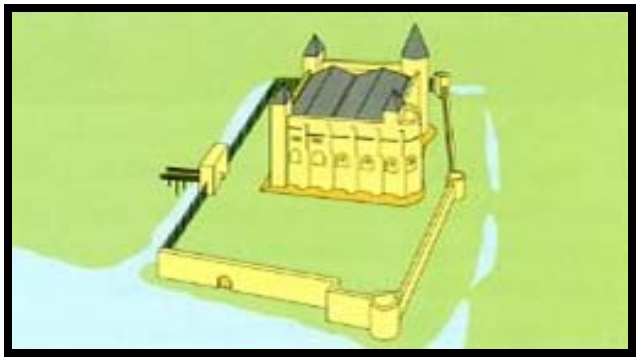
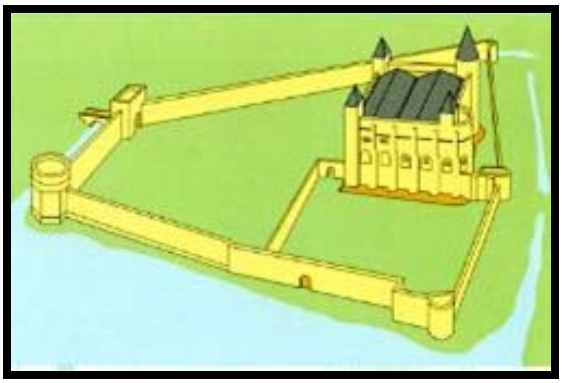


**Figure 2 - 1: Original Layout**[1]

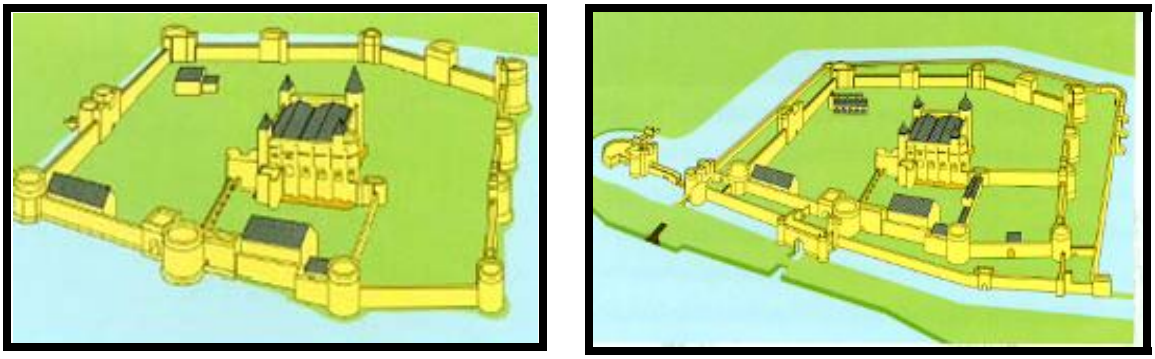
[1] http://www.castles.org/castles/Europe/Western_Europe/United_Kingdom/England/england12.htm, 1/22/05

After its completion in the 12th Century, the tower underwent a series of expansions which began in 1189 under William Longchamp, justiciar of Richard I. (Time chart, page 1, 2004) This first expansion, as shown in Figure 2 - 2, expanded the footprint of the castle grounds, but not the Tower itself.



**c. 1200**
**Figure 2 - 2: First Expansion[1]**

These expansions continued under Kings Henry III and Edward I and were furthered by King Henry VIII, which brought the Tower to its current layout. Figure 2 - 3 below shows these two expansions, with the image on the right being the more recent expansion.



c. 1270 c. 1547

**Figure 2 - 3: Subsequent Expansions[1]**

Throughout these expansions, the Tower filled several roles for the royal family and for England as a whole. One of the more prominent roles included functioning as a prison for high level political captives. This practice began in the 1100s, when the Tower held Ranulf Flambard (also the Tower's first escapee). The Tower also held such notables as Sir Thomas More, Lady Jane Grey, Guy Fawkes and countless others, about 28 people of which were executed. The final

prisoner held in the Tower was Rudolph Hess, a deputy of Hitler, during WWII. (Time chart, page 5, 2004)

Some of the Tower's more continual uses were as a mint, which was established as early as 1248, and a royal menagerie, when the first exotic animals were imported to and held for display in the Tower in 1252. (Time chart, pages 1-2, 2004) These roles continued until 1810 and 1834 respectively, shortly before the Office of Ordnance rose from the bureaucratic fray and took over control of the Tower as its headquarters (although it had been the largest arsenal in the kingdom since the 100 Years War). (Time chart, page 5, 2004) Another role that the Tower steadily held was as a base of power for those who wished to control England. Beginning with William the Conqueror, the Tower was occupied by the French, Roger Mortimer, the London public (thrice), the Lancastrians (during the Wars of the Roses), and various British monarchs. In all cases, the Tower was seen as the symbolic throne of the capital, and anyone who held it held sway over the nation. (Time chart, page 2, 2004)

## *2.2 Transition from Royal Palace to Museum*

Over the course of its history the Tower of London was slowly transformed from a fortification, to a royal residence, to a prison, to a headquarters for the Office of Ordnance and ultimately into a museum. The Tower was first used as an attraction to educate visitors when the Royal Menagerie was established inside the Tower walls. England's monarchs hoped to have lions roaring at visiting foreign dignitaries as they walked into London's greatest castle, in order to "educate" them about Britain's power. Several hundred years later, in the mid to late 16$^{th}$ century, the first members of the public were paying £1.05 to the visit Tower and Armouries. (Time chart, page 3, 2004) Shortly thereafter, in 1665, the Tower began admitting the public to see the Crown Jewels. (Time chart, page 4, 2004) In 1815, the Tower stopped allowing museum goers to touch the Crown Jewels, which had previously been held in a cage with holes large enough for visitors' hands. (Time chart, page 5, 2004) The Tower's popularity as a museum continued to grow, until the World War period, when parts of the Tower were damaged or destroyed. After substantial reconstruction, the Tower again began receiving visitors, reaching a point in 1977 where it received over 3 million visitors in a single year. It was also around that time that the Education Service was set up in the Tower, as tenants of the Armouries. (Time chart, page 5, 2004)

## 2.2 Royal Armouries

The sponsor for this project was the Royal Armouries Educational Centre, who is a subsidiary of the Tower of London. The Educational Service wanted to determine the effectiveness of the museum in terms of its ability to teach visitors and keep them interested in the material.

## 2.3 "Hands on History" Exhibit

The "Hands on History" exhibit was a "celebration of thirty years of Education at the Tower of London" (p.1, "Hands on History", 2004). The "Hands on History" exhibit was located on the third floor of the White Tower occupying approximately one-half of the third level floor space. The floor plan, shown in Figure 2 - 4 on the next page, is a floor plan showing the layout of the exhibition at the time of evaluation.

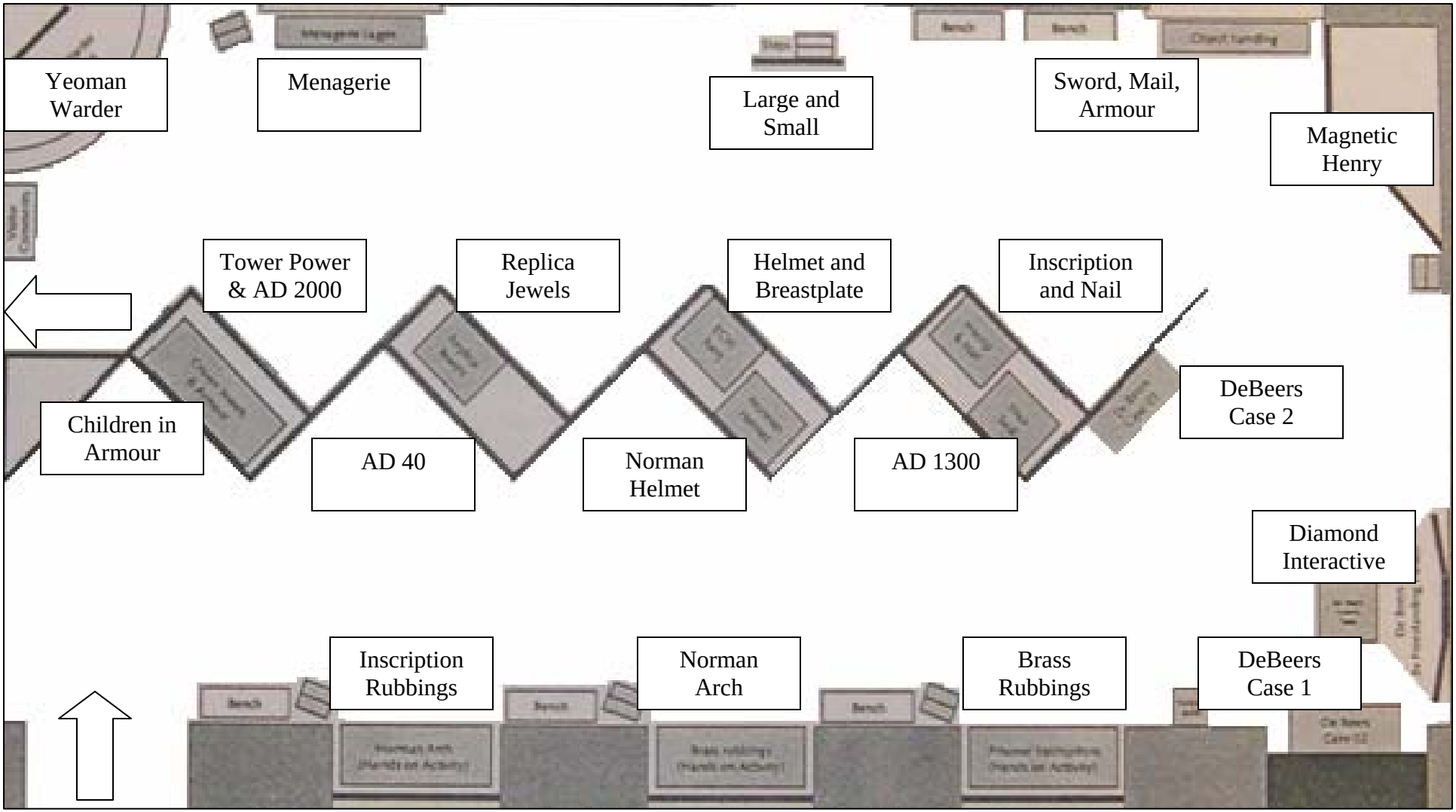



**Figure 2 - 4: Floor Plan**

The exhibit formed a zigzag of three-foot wide panels down the middle of the floor space (which can be seen below in Figure 2 - 5).

**Figure 2 - 5: "Spine" showing parts of the collection**

Part of this exhibit was sponsored by the Diamond Trading Company (DTC), which supplied a small interactive computer exhibit and other materials from its stock and operation. This exhibit included a computer game intended for children about detecting flaws in diamonds (see Figure 2 - 6).


**Figure 2 - 6: A DeBeers interactive display**

Lighting was generally low throughout the exhibit, except in a few key areas, where better lighting was required to fully experience a part of the exhibit. The displays were predominantly

case displays with labels placed low where children could see them. Some of the sub-exhibits focused on arms and armour (as seen in Figure 2 - 7 below), while others focused on less violent artifacts, such as paintings, clothing, engravings and manuscripts.

**Figure 2 - 7: An example of some sub-exhibits**

## *2.4 Museums*

It is important to understand the role of museums in today's society. Once a basic understanding of function is achieved, more specific aspects can be examined, such as the different types of displays that are put forth, and how they impart the audience with the intended information. The way that the displays are created is also important to look at, along with the atmosphere that the display has and the feel of the museum in general. Another consideration in museum displays is whether they are presented in a guided tour, or whether the patrons are allowed to simply walk through at their own pace.

The role of a museum is dependent on what is displayed while they serve several functions in today's society. There are different types of museums, such as art, history, science, etc. The content of these museums is often reflected by its title, and many museums have a specific focus. The main goal of historical museums is to preserve knowledge and artifacts of the past while allowing the public access to that knowledge and information. Museums are not solely money driven organizations, which can make for difficulties when considering renovations or expansions, as stated by Jeffery Forgeng, Higgins Armoury Curator (2005, February 2). Instead, museums focus on the content and information that they are able to keep available.

Display setup is a vital concern for museums. It is an important factor in determining whether or not the museum can reach its previously stated objectives of preserving and imparting knowledge. If the museums displays are not well received by the regular attendants of the

museum, then fewer people will visit the museum and also take less information away from the whole experience. The museum may be able to preserve the knowledge and artifacts that they have, but would be unable to spread that knowledge.

For the museums to meet their objectives of being educational and interesting, not every display should be set up in the same manner. Different types of exhibits will require different types of media to effectively convey the intended meaning. Another issue, discussed in a later section, is that people have different learning styles, or ways that they are able to most effectively absorb information. This requires that different methods be used for display, allowing there to be something for everyone to enjoy and learn.

There are two main categories that types of displays fall under, namely high-tech and low-tech. An example of a high technology display would be a digital touch screen that allows for such things as virtual tours of buildings, landscapes and manipulation of 3D renderings of objects. A low technology exhibit is a more traditional item in a glass case with a short piece of text for the audience to read, or a replica helmet for people to hold and try on. Both of these methods can be interactive or non-interactive. The interactive portions of museums are very popular as an educational tool with children, as well as adults. Both of these categories offer effective tools when used in the proper manner and targeting the proper audience' learning style.

Another consideration for museums and their exhibits is the atmosphere in which they are presented. This is a very important factor in capturing the interest of the patrons. There are many factors that affect the overall atmosphere of the museum. The attitude and enthusiasm of the staff plays a role in the museum experience. The visual appeals of the displays are important for the atmosphere. Also important is how the auditory aspects of the museum affect the atmosphere, as well as the less frequent tactile portions of the museum and exhibits.

The personnel who act as representatives of the Tower throughout the museum are sources of information and supervisors for the safety of visitors and exhibits and contribute a great deal to the overall feel of the museum. If the personnel seem detached and uninterested or not knowledgeable, then it is harder for the patrons of the museum to gain information, and likely will decrease their own degree of interest in the exhibits.

The visual aspect of the museum and exhibits also plays a very important role in the atmosphere. This can greatly depend on the type of exhibit. Things such as lighting and colour schemes are excellent means for helping to create a certain mood. "Under experimental laboratory conditions, colour has been found to affect changes in mood and emotional state, psychomotor performance, muscular activity, rate of breathing, pulse rate and blood pressure." (Lackney, Jeffery A., 2000, p 3). On a tour of the Higgins Armoury (2005, February 2), one will

notice that instead of having arms and armour mounted on plain walls, the walls are made to resemble the Inscription and Nail work one might see in a medieval castle. This is also true for the some of the windows which have been modeled after medieval stained glass. The lighting is dim but not dark, with brighter patches focusing on pieces and text. The overall effect of this is to give the museum a very old, castle-like feel, perfect for viewing ancient arms and armour.

Another important factor is the auditory component of the atmosphere. Examples of this would be a quiet and somber setting for a more serious exhibit, or music from a certain era that the exhibit is portraying. However, this must be done carefully. Hearing the same tune over and over will get tiring and irritate visitors, meaning that their time in that portion of the display must be relatively short, or there must be a variety in the music or dialogue that is being played.

Something not often associated with museums is the tactile sense, or what you can physically feel. This is something that mainly applies to hands-on exhibits which let you actually touch and feel items, usually replicas. This can also be found in the tour of the Higgins Armoury (2005, February 2). It has a children's area with such things as replica helmets that people can try on and look at themselves in a mirror. This has proved to be a very effective way to interest people in subjects and ensure that they not only learn something but enjoy the experience as well. "Tactile learners need to touch and hold things because information goes to their brains though their hands." (Cleaver, Joanne, 1992, p 16)

## *2.5 Learning Methods in Museums*

The Royal Armouries and the HM Tower of London are interested in teaching museum patrons about the history of the Tower and its place in the histories of London and England; they aspire to do this in an interactive, self-discovery manner that allows the visitors to take away some history when they leave the Tower's walls. Though the specific educational goals will not be the same for every visitor, the Royal Armouries would like to draw out interest and intrigue from each exhibit visitor. In order to establish a successful, informative museum exhibit, it is advantageous to develop a clear understanding of how people learn through museum exhibits. Museum learning research is a new field of scholarly study, with rising interest in the last 15 years. Jeffrey and Wandersee (1996) state that, "Excellence and Equity: Education and the Public Dimension of Museums (AAM, 1992) is the first major report focusing on museums' educational role to be issued by the American Association of Museums" (p. 4). Furthermore, Jeffrey and Wandersee acknowledge the relevance of the document:

> The report has become a focal point for the museum education community, encouraging museums professionals to increase the effectiveness of informal education by reaching out to diverse audiences at every stage of life, from preschooler to adult. (p. 4).

Various learning methods have been recognized through prior research of museums. These learning methods and styles will differ for several appropriate demographics: age, gender, culture, and educational background.

### 2.5.1 Learning through Museums

The learning that occurs in a museum setting has yet to be exactly defined. Various museums have various conceptions on what constitutes "learning." Some museum educators may identify "learning" as cognitive gains, while others may consider it the lasting, memorable effect the museum has on an individual. Supporting this absent definition of museum learning, Jeffrey and Wandersee (1996) state, "The precise meaning of the word 'learning' is ill-defined in the museum setting" (p. 3). However, Cleaver (1992) gives an appropriate definition for museums learning:

> In all truly participatory exhibits, the process of learning is just as important as the end result. The goal isn't to memorize a list of historical dates or other minutiae, but to feel and experience why something happens or is the way it is. (p. 13)

Due to this ambiguity, it appears useful to investigate *all* the styles that researchers will argue will increase "learning."

A general method of learning that researchers argue is effective for many museum visitors is to allow free walkthrough of the exhibit. In this manner people are allowed to travel through the exhibit at their own pace, observing and interacting with what they feel is interesting. Hilke (1988) has determined, "visitors are more likely to follow their own agendas than to recognize and accept the exhibit theme intended by the designers" (p. 120). Cleaver (1992) labels these people "random learners" (p. 13) compared to the "linear learners" (p.13) that prefer to walk through the exhibit in the order that the creator intended. It may be argued that the more the visitors are interested, the more they will learn. Hicks (1986) states that, "In museums…objects are the basis of the learning process, which is less structured and partially directed by the learner's own interest, ideas, and experience"(p. 2). Interest levels and educational value may be linked more closely than would first seem reasonable. Supporting this stance, "…people will learn best when they have opportunities to make choices about their own learning and chances to build on their own interests" (Kimche, 1978, p. 3). Following this ideology, it is most productive for museum curators and educators to allow visitors to go about

the exhibit as they please will little guidance. Through this method, cognitive gains may occur, just not as the museum educators originally intended.

Cleaver (1992) compares these learning styles in a more direct method: "Similar is some people's preference for *structured learning*, typified by an attitude of 'let's find out what we're supposed to do here;' *open-ended learners* randomly experiment to see what will happen" (p. 13). The key to the success of a museum exhibit is to incorporate qualities that support these various learning styles and methods.

Several researchers have found that interactive exhibits enhance the learning process. Museums that allow the patron to partake in the museum exhibits have been found to be more effective in conveying educational information. Cleaver (1992) describes the benefit to education of the interactive museum in that, "visitors don't just learn about something; they learn because they do it and prove it to themselves. They gain ownership of a concept through personal experience with it." (p. 12). This philosophy that hands-on methods assist the learning process is supported by other researchers. Kimche (1978) says, "The findings of Laetsch, Screven, and Schettle correlate well with the theories of many educators who have found that learning is enhanced when the learner is involved in the self-discovery" (p. 4). Other research has concluded that an interactive exhibit supplemented with textual information maximizes the learning process for museum patrons. Bearman (1991) argues that coexistence between the two is vital to the learning process. He states, "Although we hear much of visual literacy versus textual literacy, it is not a question of words or images being superior. They provide different and therefore complementary routes to knowledge" (p. 15).

Through the means of involving the museum patron with the exhibit, a more in-depth educational experience will be obtained. With this in mind it is necessary to understand what kinds of groups visit museums and how to best get them to interact with the exhibits. While school groups are an important set of people that visit museums, the number of groups other than school groups that visit the museum is underrated. Indeed, it was reported in 1989 that 70% of social groups that visited the British Museum (Natural History) were not associated with a school in any way (Jeffrey & Wandersee, 1996, p .3). Although this research is several years old and schools have incorporated museums into their curriculum, it is noteworthy to recognize the diversity of social groups that visit museums. Certain researchers argue that the most educational experience in a museum will occur with the family. By interacting with the exhibit and each other, it is often considered that the familial unit will reap the most cognitive gain. Continuing, Jeffrey and Wandersee explain family learning: "Visitors tended to pursue their personal strategies over cooperative strategies, although they were still bound to the group, and

they broadcast information to other group members" (1996, p. 3). This theory is supported by research done by Laetsch. Kimche states, "his [Laetsch] research has show that adult-child combinations spent more time at the exhibits selected for observation than did the child-child or adult-adult combinations" (1978, p. 3). Furthermore, Whittle (1997) explains that the family environment increases child learning with, "I observed a number of instances where a child seemed bored or chose not to interact with an exhibit until a parent joined them, thus confirming the benefit of parental involvement" (p. 12). With this in mind, it is apparent that museum exhibits should be created to encourage interaction between family members of different age groups.

### 2.5.2 Demographics

In the methodology the team applied the researched learning methods and styles and analyzed the results for several demographics: age, gender, culture, and educational background. These demographics represent those that are most relevant to the "Hands on History" exhibit and other interactive museum exhibits. It was critical to the effectiveness of the museum display that as many of these parameters were covered as thoroughly as possible. Additionally, the museum would like to appeal with a certain demographic group in particular with this exhibit, namely families. Given that this is the case, how the exhibit functions with respect to familial units will be discussed throughout this section.

#### 2.5.2.1 Age

The effectiveness of the "Hands on History" exhibit was evaluated through the determination of how well it integrates a varied range of ages. The Tower of London and the Royal Armouries (2005) describe the necessity of an exhibit that instructs people of all ages: "The need to find ways to engage the family audience which visits during school holidays, but while still recognizing that the bulk of the visitors are foreign tourists, is a difficult one to address" (p.3). Therefore, it is critical that the museum exhibit being evaluated contain sub-exhibits that are interesting to a variety of visitors. Research has indicated that age can be a necessary variable to address when analyzing a museum exhibit's success in educating its visitors. Kuh, Simmons, Sorge, and Whittle (1997) have concluded in their research into the effects of age on museum learning, "We discovered that teenagers spent significantly more time at the exhibits than any other age group…[which] may suggest something about their willingness to explore or may

indicate an increased tolerance for assimilation of learning"(p. 25). In related research, Whittle (1997) found that age had an effect on learning in museums:

> Children were the most frequent active participants at the exhibits observed….In all age groups after childhood, except for forty-somethings, passive interaction was the preferred mode of interaction with the exhibits. Age appears to be a significant factor in whether a visitor takes an active or passive role at the museum. (p. 11)

With this previous research concluding that age affects learning preferences and ability in museum settings, it was necessary to incorporate age factors into research at the Tower of London. Due to the fact that "Hands on History" is being used to display the history of the Tower and the history of the Educational Department, it is largely geared towards children. Thus, text size, reading levels, and material presented must be acceptable for younger children, while also maintaining interesting themes for older children. Furthermore, it was imperative that the exhibit not be "dumbed-down" so that older family members and other tourists cannot appreciate the exhibit. Ideally, the museum exhibit should involve all age groups in an interactive manner.

In order to appropriately accommodate the varied age groups, there should be a variety of teaching methods. Cleaver (1992) mentions differences that often exist between children learning styles and parent learning styles. She says:

> Your own learning style may be different enough from your child's that you'll need to suppress the urge to 'walk him through' particular exhibits or otherwise mold your child's learning style to fit your own. Give kids space to key in to the exhibits in their own style. (p. 14).

An effective exhibit will allow all age groups to take something away from their experience. The Tower of London and the Royal Armouries also state that, "The visitor experience can be enhanced and improved for all by offering activities specifically to engage the children in family groups, to hook the parents and by giving a good experience, make the whole day better" (2005, p.3).

Finally, the exhibit should incorporate a multitude of the learning preferences and styles. In doing this, the museum will be ensured to educate as many people as possible. Variety is the key; people absorb and interact with information from the exhibit by different means.

### 2.5.2.2 Gender

In order to adequately educate both the male and female genders there must be portions of the "Hands on History" exhibit that interest both groups. It is crucial that this exhibit is not directed solely toward one gender. Research has shown that gender affects learning in museums.

Randle and Anderson (1999) state in the conclusion of their study into the affect of gender in museum learning:

> This study points to consistent similarities in the types of activities preferred by boys and girls, though there is differentiation based on a greater interest by girls in extended cooperative learning tasks, aesthetic issues, and investigative inquiries that emphasize more broad and inclusive outcomes, and involve less discrete and instrument-based learning skills. (p. 4)

Other research completed supports the notion that gender differences exist in learning at museums. Whittle (1997) concludes of his gender study in museums, "Women and girls will spend almost one-third more time at a particular exhibit then males" (p 12). This belief that males and females learn through different means in museum settings is supported by other experiments. According to research conducted by Ayres and Melear (1998), "…females seemed to spend more time interacting with the hands-on exhibit, and males seemed to spend more time at the multimedia" (p. 12). Due to the fact that much of the history of the Tower of London involves arms and armour, female visitors, especially young, may feel detached. The goal of the Educational Services is to convey the history of arms and armour to both males and females. The Tower desires to ensure that the history of males and females alike are displayed through the exhibit. The "Hands on History" exhibit involved a sub-exhibit that contained the history of DeBeers. While this section primarily exists because DeBeers supplied money for exhibit, it also involves young females in the exhibit. The Tower staff is aware that there may have been a gender problem due to the nature of arms and armour. The DeBeers sub-exhibit is a touch-screen multimedia, which Ayres and Melear have found is less conducive to many females' learning styles in museum environments. In the past, museum surveys have revealed that young girls often feel detached from material displayed in this way. This is largely due to the fact that many young girls cannot relate their own lives to that of the history being presented. Cleaver (1992) acknowledges the useful method of comparing people's present lives to the past, "Overall the key to making the past relevant today is to establish a direct relationship between what the children see and their own life experiences. Help them find the things that remind them of their daily lives before emphasizing the old and different" (p. 21). It is imperative that the museum exhibit finds means to integrate both genders in adequate ways.

#### 2.5.2.3 Cultural Differences

Although the Tower of London is enjoyed thoroughly by those of the UK, it is also a major tourist attraction for foreigners. In order to create an educational and interesting

experience that may benefit people from all countries and cultures, the exhibit must not limit itself due to cultural barriers. The primary barrier issue that should be addressed is language. It would be incredibly difficult for a non-English speaking foreign visitor to appreciate the Tower if communicating by other means was not instituted. To bypass the language barrier, the museum could use translated auditory tracks that relay the material on the labels, pictures, and hands-on experiences that do not require a common language. Though possibly expensive, these sub-exhibits must be incorporated to ensure the language does not prohibit a visitor from experiencing the Tower of London's history.

Also, it is important that the museum exhibit does not offend any cultures through the information they present and the manner in which they present it. It is unwise for a museum curator or educator to present historical material in an overtly biased manner. Often, museums subconsciously create exhibits that emphasize one side of a political issue, while looking disdainfully upon another. Duncan (1991) speaks of this tendency to create biased museum exhibits, "In short, those who best understand how to use art in the museum environment are also those on whom the museum ritual confers this greater and better identity. It is precisely for this reason that museums and museum practices can become objects of fierce struggle and impassioned debate" (p. 102). Crew (1996) disagrees with this view, "The key is cultivating the expectation among visitors that varying points of views in museums are acceptable" (p. 6). With this in mind it is the museum's duty to present history in an un-biased manner that allows the public to draw its own conclusions.

#### 2.5.2.4 Educational Background

The "Hands on History" exhibit must appeal to a varied degree of educational backgrounds as a large number of age ranges will be viewing it. Surely, different visitors will have varying amounts of knowledge regarding the history of the Tower and the Educational Department. To adequately serve the varied backgrounds, the exhibit must have information that ranges from "basic" to "specific and complex." The museum should find a technique to display information that can interest and educate both the novice and the expert. However, the exhibit does not want to overwhelm the visitors with an excess of information. If the exhibit is too cluttered with information and facts to serve varied educational backgrounds, many visitors may feel disengaged from the exhibit and not experience the educational material of the exhibit. Nonetheless, it is imperative that the exhibit amply cover the contrasting educational backgrounds.

# 3. Assessment Methodology

The American Evaluation Association believes that “evaluation involves assessing the strengths and weaknesses of programs, policies, personnel, products, and organizations to improve their effectiveness” (“About Us”, n.d.). The primary topics covered in this section include the patrons’ reactions to the exhibit, visitor evaluations of their experience in the museum and the demographics of the people who visit the museum. User response was gauged in a variety of ways, including interviews, surveys and first hand observation. The demographic makeup was primarily determined from survey feedback and comment book signatures.

## *3.1 Sampling*

After observing the exhibit in vivo, conclusions were made about the practicality of available methods. Quota sampling, discussed during our background research, was not a feasible means of data collection. This was due to the flow-rate of visitors that makes it difficult to interview visitors who matched specific demographic descriptions. Furthermore, quota sampling was not necessary as the demographic constraints from which we desired feedback was solely English speakers. In other words, our sample, no matter the composition, represented this group. With such limited time and an often overwhelming flow-rate, random convenience sampling was the best method available.

The questionnaires developed focused primarily on the English speaking culture which included British, American and foreign visitors who speak English as a second language. This sample allowed us to generalize for all English speaking visitors. Non-English speaking visitors offered minimal contributions to the sample’s generalizations. Because there was little accommodation for non-English speaking visitors, it was unlikely that they acquired the information being presented during their tour.

Sample size is a controversial subject among researchers. Methods such as reviewing previous research and statistical precision can be used to estimate sample size. Fowler disagrees with this approach, stating that “in practice, however, it provides little help to most researchers trying to design real studies” (1993, p. 34). This statistical significance is based upon a reasonable standard deviation of the normal distribution curve.

## *3.2 Data Collection Methods*

There are two means of categorizing the collected data gathered through surveys: qualitative and quantitative. There are a range of situations in which each can be used successfully. To complete a successful methodology both of these means were incorporated.

Qualitative research was useful for interpreting how visitors interact with the "Hands on History" exhibit. Nardi (2003) explains in his book *Doing Survey Research* that, "If the goal is to understand human behavior in its natural setting and from the viewpoint of those involved, then an appropriate method is often a qualitative one" (p. 15) which offers supporting evidence that this type of data will need to be collected. Some basic examples of this information may are questions such as: "*How educational did you find the 'Hands on History' exhibit?*" By asking these types of questions the museum was able to analyze the open-ended cognitive learning process of visitors.

Conducting the latter approach, certain demographic questions can be answered so as to categorize information in as many ways as necessary. Nardi (2003) believes that questionnaires are applied best when determining the reactions or thoughts of people (p. 17). One of the most useful aspects to quantitative research was the ability to extrapolate statistical information and form a prediction for the general category or populations based upon a sub-sample group. In this way, it was simple to visualize how quantitative questionnaires can help a museum evaluate the effectiveness of an exhibit based on pre-determined responses.

After discussing the matter with our sponsor, we concluded that mailing surveys would be ineffective. The IQP project completed in 2004 at HM Tower of London attempted to collect data through the mail, sending approximately 150 questionnaires and receiving only 6. Nevertheless, Mrs. Clifford wanted to obtain feedback from *current* visitors as they experiment with the "Hands on History" exhibit that was representative of *all* visitors.

There have been many books written on question presentation and question wording. Tarangeau, Rips & Rasinski (2000) remind us that there are several important aspects to grammar and word choice. They point out that many words of modern language can be "ambiguous," having multiple meanings or are "vague," leaving room for interpretation. They also mention the participants' inability to comprehend "unfamiliar" or "technical terms" that could have compromised the reliability or questionnaire results (p. 24). If the questions are wordy and incoherent, participants will not be able to answer the questions to the best of their ability. The implications of this are erroneous and uneducated answers. It was found unnecessary to scale the surveys in part because they are limited to a short list of questions and

because of the congruency of the subject material covered. Surveys were created so that all participants could provide simple and useful information.

## *3.3 Data Analysis Methods*

Data can be arranged in many different ways, depending on the interviewers' interpretation. Certain arrangements allow for a different perspective. Since demographics were a foundation of this report, they were an integral part of the analysis. Visualizations such as graphs and pie charts were also helpful for comparing statistics and interpreting data.

As stated above, the analysis included in this report contains data organized into various demographic sub-categories. The purpose of doing this was to help the Educational Centre recognize trends and generalities that would go unnoticed in raw, unprocessed data. The Education Centre wanted to be able to determine how these revelations affected the way they change or update their exhibits and display methods. To this end, the data that was gathered by compiling and analyzing common characteristic codes, such as "yes" and "much better" or "no" and "much worse." These codes aided in the extraction of usable data from qualitative responses. In other words, we consistently analyzed interview responses through the use of keywords to extract coherent data from complex information. In this way the data became more presentable, making trends and solutions easier to recognize.

## *3.4 Demographic Influence*

The Royal Armouries had hoped that their "Hands on History" exhibit appealed to people across a spectrum of demographic groups, in addition to having the exhibit effectively display the information discussed in Section 3 of the background chapter of this report. These groups vary in age, gender, and ethnicity. The ability of the exhibit to appeal to many different groups of people was measured qualitatively and analyzed quantitatively.

Given that the Tower has been operating for many years, it was determined that they have already recorded significant demographic information on their patrons. However, the Royal Armouries Education Centre does not have an abundance of up to date demographic information, but this information was obtained through "comment books" that were located at the end of the exhibit for the past several months. Also, the Historical Royal Palace (HRP), which often works with the Royal Armouries, had demographic information regarding the countries from which school groups came. Though this demographic collection was selective, it demonstrated how to

categorize demographics. Since it was not known how reliable these archives of information are, they were not solely relied upon to define a representative sample.

Ultimately, the best option was the one taken by many modern college applications or market research surveys. This involves an optional demographic survey attached at the top of the surveys. Given enough of these responses, much of the demographic study was done in the analysis of the data, as opposed to more direct routes of information gathering. While this may not be the best method, it was be the most practical option to gather enough data in a short time to generate a starting point for the data.

## *3.5 Sponsor Liaison and Museum Educator Interviews*

Prior to conducting research that determined the educational success of the museum, interviews were conducted with the liaison, Bridget Clifford and museum educators. It was important to obtain information regarding what these people feel the museum exhibit should convey to the public. This led to a better understanding of the educational and interest goals of the museums after analyzing the information collected through these interviews.

The number of interviews was determined after arriving in London; the Royal Armouries Educational Centre was smaller than had originally been understood. It was concluded that interviews should be conducted with Mrs. Clifford and two educational officers on an informal basis. Furthermore, Bridget Clifford revealed that it would be effective to interview White Tower Wardens. The Wardens work on the four floors of the Tower and have had direct contact with the "Hands on History" exhibit and its patrons. Due to the time spent observing the exhibit; these wardens offered a different point of view of the exhibit's characteristics. It was important to determine if all levels of museum education are aware of the objectives of the museum, and whether people from different departments had different opinions of the effectiveness of the "Hands on History" exhibit.

Questions for Mrs. Clifford and museum educators were qualitative and open-ended. The interviews were conducted in an informal setting, with one interviewer from the group and one note-taker during the interviews. A digital recording was also stored which ensured that all answers and material were correctly and accurately documented.

After completing the interviews, through a group meeting and a collaboration of ideas, a clear picture of the educational goals and the current perception of the "Hands on History" exhibit was developed. It was useful to make the conclusions available to Bridget Clifford and museum educators. This method ensured that information was not misunderstood or misrepresented.

## *3.6 Surveys*

The simplest and most feasible way to ascertain the educational value of the museum exhibit was through Survey I given at the end of the exhibit viewing. This survey was administered using random convenience sampling. The methods described previously in the *Sampling* section were employed. Survey I and Survey II were designed for patrons over twelve years of age and will be utilized to determine the knowledge acquired after the exhibit was completed by the patron. Survey III served to determine the efficacy of the labels throughout the exhibit. However, these surveys only offered a basic understanding of the degree of material learned; questioning visitors on material observed only minutes earlier does not adequately measure educational gain. It would have been rash and irresponsible to make all conclusions from these surveys alone. Lee Kimche writes of the hesitation in using hasty evaluations, "It is possible to measure information transfer in terms of cognitive gains….But if the results of the cognitive testing are disappointing, the value of the visit should not be written off…" (1978, pg. 278). The surveys were developed to be rather simplistic and concise, as time was an issue in obtaining data.

The design of the survey questions was largely drawn from the preceding conversations with Bridget Clifford and museum educators; it seems necessary to survey and observe museum patrons on the educational material that was conveyed. Through these means, it was measured in a qualitative and quantitative way whether the museum was educating its visitors; more accurately, it was determined whether the museum was communicating the desired information.

Survey I and Survey II evaluated patrons' impressions of the exhibition. There were more qualitative than quantitative questions Survey I. To obtain a reasonable amount of willing participants, the surveys were made concise and partially open-ended so as not to intimidate the visitor with a "test" situation. Additionally, it was considered that it might be useful to incorporate an incentive for completing the survey, as this may draw visitors that may not be willing to fill out the survey otherwise. Upon arrival at the Tower, this incentive was deemed unnecessary due to the large numbers that pass through the exhibit. Obtaining an adequate number of surveys from patrons was not a problem.

Surveying was also a means to gather data on the interest people have in the exhibit, along with how educational they found it. Survey I incorporates several questions aimed towards determining the interest levels of visitors; namely, which components people enjoyed the most or least and why, and whether they felt the museum had done an adequate job

displaying the exhibit material. This survey contained three open-ended short answer questions that allowed the person to answer which exhibits were the most educational, most interesting, and the least worthwhile. By not making these questions multiple-choice, people were able to answer in an unbiased manner. Questions 1-5 on Survey II were identical to those on Survey I. However, Survey II involved four more multiple-choice questions that delved into the flow of the people, their prior knowledge of the exhibit, and their participation in the exhibit. One survey containing all of these questions would be overwhelming and too lengthy for visitors. By administering separate, but similar surveys, more information was attained.

Survey III was administered to collect data concerning the labeling of the "Hands on History" exhibit. Bridget Clifford requested that the group collect information to determine if the labels were effective. This survey aimed to determine if the labels were well placed, whether the aesthetics of the labels were adequate, and whether the reading level of the text was appropriate.

The Exhibit evaluation would benefit from an additional supplement to the questionnaires. This method of collecting data on people's level of interest was intended to supply a form at each sub-exhibit. Although these ideas would supplement the exhibit feedback, they were not implemented due to time and space constraints.

## *3.8 Visitor Observation*

This data collection method was known as ant-trail observation (Billings, 2004). Ant-trails were conducted for individuals, couples, families, and friends. These demographic groups represent the most frequented visitors of "Hands on History." According to the problem statement and conversation with Bridget Clifford it was important to the museum that the familial unit was "learning" through "Hands on History", while at the same time maintaining a reasonably high level of interest in the material being presented. By investigating a more diverse range of visitor groups, the effect on various entities could be deduced.

Ant-trails provided an additional and essential resource for determining the educational value and interest level of visitors. The method of ant trails involved following museum visitors inconspicuously from the beginning of the exhibit and marking the time spent at each sub-exhibit. Furthermore, it was recorded whether visitors read labels, interacted with sub-exhibits, or a combination of the two. By monitoring patrons as they viewed the exhibit, their educational reward and level of interest concerning specific sub-exhibits was determined. Bridget Clifford informed the team that during the seven weeks in London, there would be several shifts in nationality, age, and group types of visitors due to the Easter Holiday and half-term. Through

this method of trailing museum visitors, determinations of peoples' interest and educational reward for different portions of the exhibit were analyzed. Also, the ant trails allowed us to determine if there was a relationship between the physical set-up of the exhibit and how people interact with the sub-exhibits.

Individual data from each visitor group was complicated; the composition of the visitor group was documented during observation. According to a research project analyzing the educational effectiveness of an aquarium exhibit, "Visitors were observed at each of the interactives. A researcher noted such things as the amount of time spent at each display, what the families did, and whether there was any discussion" (Jeffrey & Wandersee, 1996, p. 5). The information collected was more useful if the observed visitor or visitors were not aware of the analysis of their actions. For instance, visitor groups may observe sub-exhibits longer or shorter if they feel anxiety from someone observing them. Observations noted which sub-exhibits were visited, time spent at the sub-exhibits known as "holding power," (Billings, 2004) and whether visitor groups interacted and read labels. This method of ant-trailing supported and corroborated the data collected from the surveys.

# 4. Results

This chapter introduces the data collected through our research; data collection methods included surveys, observations, and interviews. Each of the previously mentioned methods were utilized to gather information that would allow the determination of trends and characteristics of the material. First, demographics concerning the nationality of visitors were investigated to attain an understanding of people entering the "Hands on History" exhibit. Next, surveys were used to determine the effectiveness of the exhibit. As discussed in the methodology chapter, the surveys were completed using convenience sampling as other methods were not feasible due to time constraints and the large numbers of people visiting the exhibit. Observations were conducted to provide more specific information regarding the sub-exhibits of "Hands on History." Due to the fact that these observations were conducted discreetly, most subject bias that could possibly occur in the surveys was eliminated in the ant trails. Lastly, interviews were conducted to accumulate information pertaining to the museum educators' goals and current perceptions of the exhibit. Through the collaboration of this data, the necessary analyses will be compiled in Chapter 5: Analysis.

## *4.1 Demographics*

The demographics of the data collection included several important variables to be looked at. The sponsor had directed that most of the results should come from the local population, as that was the group that has been deemed the most important in relation to "Hands on History". This means that the focus was mainly on English speaking people who were from the region, as well as other parts of the world. There was interest in other nationalities, however, because there were many tourists who come through the museum. Additionally, there was interest in the age and gender of the visitors. These demographics were determined by examining pre-existing data from the comment books, and the surveys that were used to gather our information.

### 4.1.1 Comment Book Demographics

Utilizing the aforementioned comment books, demographic data concerning the nationality of visitors to the exhibit was gathered. Though this method may not be completely

accurate in its representation (as it was somewhat self selecting), it allowed the creation of a baseline of information as shown below in Table 4 - 1.

| Nationality | Quantity | Positive | Negative | Neutral |
|---|---|---|---|---|
| African | 32 | 30 | 1 | 1 |
| Asian | 129 | 103 | 1 | 25 |
| Australian/NZ | 41 | 30 | 5 | 6 |
| British | 1047 | 884 | 63 | 100 |
| Eastern European | 115 | 100 | 1 | 14 |
| French | 319 | 281 | 20 | 18 |
| German | 223 | 133 | 71 | 19 |
| Greek | 16 | 13 | 0 | 3 |
| India | 22 | 15 | 3 | 4 |
| Irish | 29 | 25 | 2 | 2 |
| Italian | 282 | 208 | 11 | 63 |
| Mexican | 17 | 16 | 0 | 1 |
| Middle Eastern | 36 | 30 | 4 | 2 |
| North American | 257 | 222 | 10 | 25 |
| Northern European | 142 | 124 | 2 | 16 |
| Pacific Islands | 14 | 14 | 0 | 0 |
| Polish | 82 | 61 | 5 | 16 |
| South American | 84 | 57 | 5 | 22 |
| Spanish | 186 | 127 | 15 | 44 |
| | | | | |
| **Totals** | **3073** | **2473** | **219** | **381** |

**Table 4 - 1: Comment Book Response**

As the above table shows, 44.7% of people who chose to make use of the comment books were native English speakers, while 32.9% of visitors who used the books came from elsewhere in Europe. This left 22.4% of patrons that came from more exotic, non-English speaking locations who also used the comment books.

## *4.2 Survey I/II Questions 1-5*

In Surveys I and II, questions one through five were identical, so results from both surveys will be represented here. These five questions were placed on both surveys, as they were the core of the research being conducted. Through the administration of prototype surveys and conversation with the sponsor, Bridget Clifford, these five questions were deemed relevant and were kept for data gathering. The other questions on Survey I and Survey II investigate more specific entities of our research. The reasoning behind and purpose of each question will be explained, followed by its importance and a tabular breakdown of responses.

### 4.2.1 Question 1

**What type of group did you visit "Hands on History" with?**

Question One on Survey I and Survey II was used to develop an understanding of the types of people and groups observing the exhibit. It was pertinent to determine whether certain groups found "Hands on History" more effective than other groups, and whether the type of visitor correlates to other questions on the surveys. This question was multiple-choice, but also contained an additional choice "Other" for those rare circumstances when the visitor did not fit into a predefined category. Results from this question can be seen below in Table 4 - 2.

| Q1 | Total | 216 |
|---|---|---|
| No Response | 1 | 0.5% |
| Individual | 38 | 18% |
| Family | 106 | 49% |
| Friends | 41 | 19% |
| School Group | 25 | 12% |
| Other | 5 | 2% |

**Table 4 - 2: Survey I/II Question 1 Response**

### 4.2.2 Question 2

**Do you enjoy history?**

Question Two was a multiple choice question with three possible responses: Yes, No and Neutral to the Subject. This question was asked of respondents in order to determine if they had any pre-existing biases towards the subject matter. In doing so, generalities could be drawn about how the answer to this question relates to responses to subsequent questions. Below in Table 4 - 3 are the overall result from this question.

| Q2 | Total | 216 |
|---|---|---|
| Yes | 199 | 92% |
| No | 3 | 1% |
| Neutral | 14 | 6% |

**Table 4 - 3: Survey I/II Question 2 Responses**

### 4.2.3 Question 3

**How educational did you find "Hands on History" exhibit?**

Question Three on Surveys I & II was used to collect data pertaining to how educational visitors found the "Hands on History" exhibit. The set-up of this question was multiple-choice with four different choices, the results from which can be seen below in Table 4 - 4.

| Q3 | Total | 216 |
|---|---|---|
| Very | 138 | 64% |
| A little | 74 | 34% |
| Not much | 4 | 2% |
| Not at all | 0 | 0% |

**Table 4 - 4: Survey I/II Question 3 Responses**

### 4.2.4 Question 4

**How interesting did you find the "Hands on History" exhibit?**

Question Four was a multiple choice question with the following responses: Very, A Little, Not Much and Not at All. This question had the obvious purpose of directly obtaining the respondents feelings about the level of interest they have for the exhibit. The responses to this question can be seen below in Table 4 - 5.

| Q4 | Total | 216 |
|---|---|---|
| Very | 140 | 65% |
| A little | 73 | 34% |
| Not much | 3 | 1% |
| Not at all | 0 | 0% |

**Table 4 - 5: Survey I/II Question 4 Responses**

### 4.2.5 Question 5

**How did the "Hands on History" exhibit compare to other exhibits at HM Tower of London?**

Question Five on Survey I and Survey II was a comparative question used to determine how respondents compared the "Hands on History" exhibit to other exhibits at HM Tower of London. This question seemed important to obtain knowledge about the way people viewed the hands-on experience with the more display-oriented exhibits of the museum. This question was

also multiple-choice, with five different qualitative answers, the results from which are displayed below in Table 4 - 6.

| Q5 | Total | 205 |
|---|---|---|
| Much better | 41 | 20% |
| A little better | 69 | 34% |
| Same | 86 | 42% |
| A little worse | 9 | 4% |
| Much Worse | 0 | 0% |

**Table 4 - 6: Survey I/II Question 5 Responses**

## *4.3 Survey I Questions 6-7*

Questions 6 and 7 addressed the visitors' opinions of the exhibition after they had experienced it first hand. Specifically, it inquired as their interest and education levels, respectively. Below in Table 4 - 7 is a comparison chart showing the response totals of the open-ended questions.

| **Recorded Responses (percent of total votes)** | | |
|---|---|---|
| *Most Common Responses* | *Educational* | *Interesting* |
| DeBeers Cases 1 and 2 | 16% | 24% |
| Sword, Mail, Armour | 22% | 20% |
| Magnetic Henry | 17% | 13% |
| Spine Timeline | 17% | 8% |
| Norman Arch | 14% | 5% |
| Yeoman Warder | 5% | 6% |
| Replica Jewels | 3% | 6% |
| Large and Small Armour | 2% | 3% |
| Diamond Interactive | 2% | 4% |
| Menagerie | 2% | 0% |
| Brass Rubbings | 0% | 10% |
| Painting | 0% | 1% |
| **Total Votes** | 63 | 79 |

**Table 4 - 7: Question 6 & 7 Responses**

## *4.4 Survey II Questions 6-9*

The remainder of Survey II consists only of multiple choice questions. While there was an option for respondents to write additional comments about their exhibit experience, this was entirely optional and was only be used if a clear trend existed in the comments. The purpose for using only multiple choice questions was to guide the museum-goers' responses to specific areas that the sponsor was concerned with, as opposed to open ended questions. These types of

responses were also easier to draw conclusions from, as there was a limited set of responses that can be given and thus these responses could be more easily catalogued.

### 4.4.1 Question 6

**Did you feel crowded in the "Hands on History" exhibit?**

Question Six was a binary question, meaning that visitors could only answer "yes" or "no". This question was introduced to the survey at the behest of the project's sponsor in order to judge whether the space allotted and layout of the exhibit were appropriate for the material presented. The overall responses to this question can be seen in Table 4 - 8.

| Q6 | |
|---|---|
| Yes | 33% |
| No | 66% |

**Table 4 - 8: Survey II Question 6 Responses**

### 4.4.2 Question 7

**Prior to your visit, were you aware that HM Tower of London had an interactive, hands-on exhibit?**

Question Seven of Survey II was used to determine whether visitors to H.M Tower of London were aware that there was an interactive hands-on exhibit. This question was added to the initial, prototype survey at the request of Bridget Clifford. She wanted to know how many people came to the museum with knowledge of "Hands on History" and how many simply went through the exhibit because it was located in the White Tower. This question allowed analyses to be made regarding the correlation between a person's prior awareness of the exhibit, and their experience. The question was formatted with "yes" and "no" answers, with the following results (see Table 4 - 9).

| Q7 | |
|---|---|
| Yes | 13% |
| No | 86% |

**Table 4 - 9: Survey II Question 7 Responses**

### 4.4.3 Question 8

**Did you participate in interactive sections of the exhibit?**

This question was posed with a yes or no answer. Its purpose was to provide a means of finding what demographic groups use the interactives, as well as the percentages of the total population going through the exhibit that use them. The visitor response to this question can be seen below in Table 4 - 10.

| Q8 | |
|---|---|
| Yes | 75% |
| No | 24% |

**Table 4 - 10: Survey II Question 8 Responses**

### 4.4.4 Question 9

**Did you read the instruction labels for the interactive sections of the exhibit?**

Question Nine of Survey II was used to establish a method to determine the number of people that read the labels located with the interactive portions on the exhibit. The question was asked with a "yes" or "no" answer. This question was put onto this survey due to Bridget Clifford's interest in knowing the percent of people that utilize the labels associated with the interactives of the exhibit. However, it has been kept in mind that people will oftentimes attempt to "please" the surveyor and thus answer untruthfully with questions pertaining to "expected" actions. Therefore, people that mark that they read the labels may not have always done so. With this in mind, the observations will provide an additional, and less-biased, interpretation of the number of people that were reading the labels. Nonetheless, the data collected through this question will allow us to develop a general determination of the number of people using the labels. Results from this question can be seen below in Table 4 - 11.

| Q9 | |
|---|---|
| Yes | 71% |
| No | 29% |

**Table 4 - 11: Survey II Question 9 Responses**

## *4.5 Ant-trail Observations*

In order to obtain additional information regarding the various sub-exhibits of "Hands on History," ant-trails were incorporated into the research. Visitor groups were followed during their entire time in the "Hands on History" exhibit to collect relevant data. As discussed in chapter 3. Assessment Methodology, ant-trails were conducted without the visitors' knowledge to ensure that actions were unbiased. Data was collected pertaining to time spent at each portion

of the exhibit. Also, notes were taken regarding whether people took part in the interactives, read the labels, or a combination of the two. This data was crucial to determine which types of sub-exhibits of “Hands on History” were useful, which needed revamping, and which should have been eliminated. In the next chapter the reasoning behind why certain segments of the exhibit were successful will be investigated. In Table 4 - 12 and Table 4 - 13 on the next page, the raw data from interactive and non-interactive exhibits are displayed.

| | Child. in Armour | AD 40 | Norm Helm | AD 1300 | DB Case 1 | DB Case 2 | Inscrip and Nail | Helmet & Breast | Replica Jewels | AD 2000 | Tower Power | Yeoman Warder | Avg. Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***TOTALS*** | 32:11 | 11:03 | 08:17 | 07:15 | 18:24 | 15:07 | 03:13 | 04:02 | 16:49 | 03:19 | 01:42 | 16:20 | **11:28** |
| ***Visited?*** | 64 | 20 | 16 | 14 | 26 | 28 | 7 | 7 | 32 | 8 | 5 | 31 | |
| ***Total People*** | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | |
| ***% Visited*** | 82% | 26% | 21% | 18% | 33% | 36% | 9% | 9% | 41% | 10% | 6% | 40% | **28%** |
| ***Avg. time*** | **00:25** | **00:08** | **00:06** | **00:06** | **00:14** | **00:12** | **00:02** | **00:03** | **00:13** | **00:03** | **00:01** | **00:13** | **00:09** |

**Table 4 - 12: Ant Trail Non-Interactive Exhibits**

| | Inscrip. Rub. | Norman Arch | Brass Rub. | Diamond Interactive | Magnetic Henry | Sword, Mail, Armour | Large and Small Armour | Menagerie | Avg. Time |
|---|---|---|---|---|---|---|---|---|---|
| ***TOTALS*** | 37:59 | 13:36 | 32:34 | 28:09 | 25:08 | 24:35 | 32:11 | 19:42 | **26:44** |
| ***Visited?*** | 27 | 17 | 17 | 19 | 18 | 33 | 31 | 28 | |
| ***Total People*** | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | |
| ***% Visited*** | 35% | 22% | 22% | 24% | 23% | 42% | 40% | 36% | **30%** |
| ***Avg. time*** | **00:29** | **00:10** | **00:25** | **00:22** | **00:19** | **00:19** | **00:25** | **00:15** | **00:21** |
| **Read** | 11 | 6 | 3 | 2 | 12 | 8 | 0 | 12 | |
| **Interacted** | 13 | 8 | 9 | 9 | 6 | 20 | 23 | 18 | |

**Table 4 - 13: Ant Trail Interactive Exhibits**

## *4.6 Warden Interviews*

Along with the data that was collected through surveys and ant trailing, the Wardens of the White Tower were utilized as an additional source of information. We hosted short interviews with two of the Wardens in which a series of questions were asked pertaining to the effectiveness of the exhibit from their perspective.

When inquired about the space allotted for the exhibit, the Wardens responded that there was room for improvement and based on their observations, the next section details their suggestions. The area was viewed as being too small, giving the exhibit a crowded feel at peak times, the numbers of which can be seen in Appendix J: Visitor Numbers. It also affected the Wardens ability to secure the exhibition, as it was not always possible to oversee the crowds of people, as well as hampered their ability to move quickly through the exhibit. The size and layout of the exhibit also contributed to its messy appearance, as paper from the "Inscription Rubbings" and "Brass Rubbings" would be thrown on the floor and build up rapidly.

For improvements, the Wardens suggested the absence of partitions that divide the area as severely as the one currently in Hands on History, allowing for freer movement of the visitors and would add to the floor space of the exhibit. Also, they recommend having two entrances to the exhibit to cut down on the bottlenecking that often occurs with the current set up. The Wardens suggested increasing the atmospheric feel, adding in such elements as music from fitting eras. They also mentioned the fact that carrying materials, such as paper for the "Inscription Rubbings" and "Brass Rubbings," up the stairs all the time was bothersome, and a small storeroom near the exhibit would be very useful.

The two Wardens who were spoken with also felt that spreading interactives throughout the Tower might be useful. This would engage people's interest when they might otherwise pass by material in the museum. It would also give people something that they were supposed to touch and feel, fulfilling their desire to interact, whilst refraining from touching delicate relics. The computer portion of the exhibit was popular with the Wardens; unlike the "Brass Rubbings", it generated no trash or graffiti. The Wardens also acknowledged the fact that if an exhibit were to be placed in the optimal location, it would be on a lower floor; some people were unable or unwilling to make the trip to the top of the White Tower. While better placement would benefit the information given by the hands-on learning experience, it clearly still contains the same inherent problem in that the items on the third floor will be partially missed.

The Wardens had some other general comments that they felt might be helpful, and pertain to the Tower as a whole, not just the Hands on History exhibit. They have noticed that

when children are happy, they pay attention and therefore learn better. This makes captivating their interest a key part in their learning experience.

# 5. Analysis

Using data collected through surveys and ant-trails, an analysis of this data has been done, of the "Hands on History" exhibit by using the methodology described previously.

## *5.1 Demographics*

The demographic breakdown of people who visit the Tower was important as it identifies certain groups that visit the Tower and allows the staff to cater to the majority, while disenfranchising no one.

### 5.1.1 Comment Book Demographics

As described previously in section 4.1.1, the Comment Book demographics data determined a general understanding of the people that visit the "Hands on History" exhibit. Shown below in Figure 5 - 1 is a pie chart that represents the breakdown of visitors to the Tower by nationality.

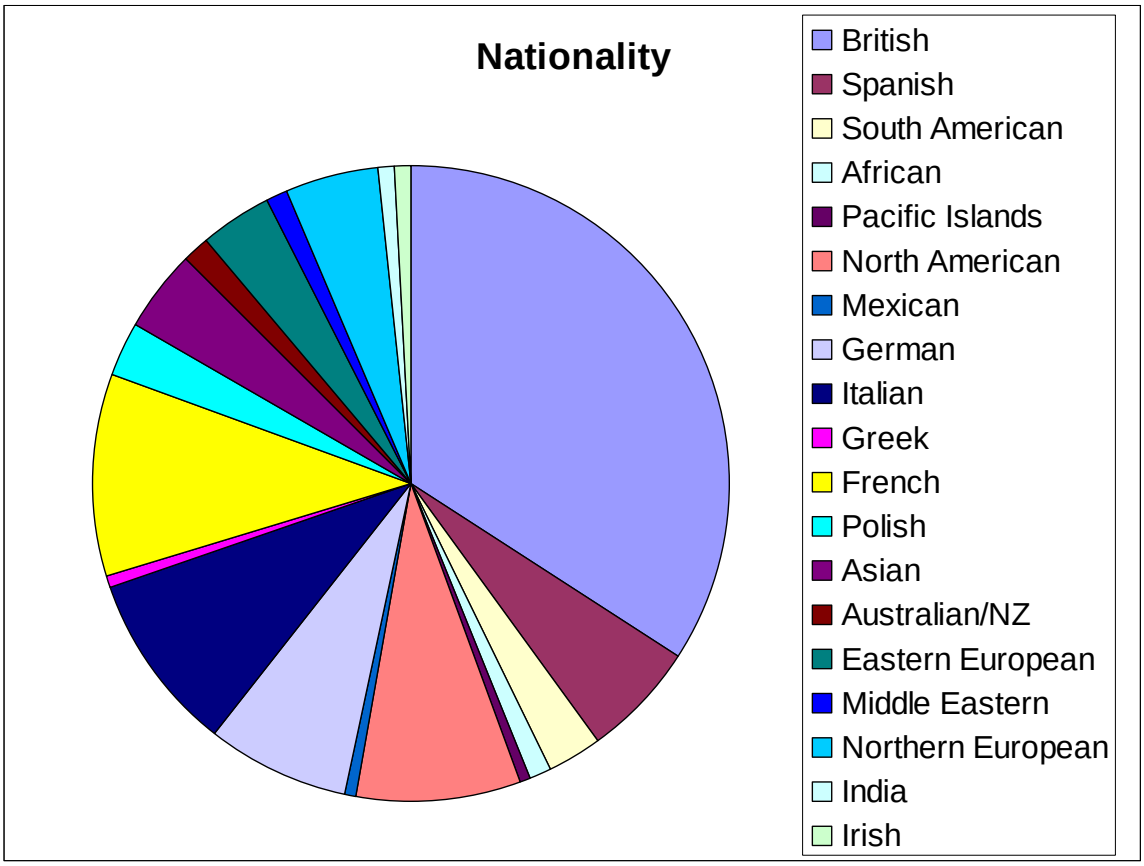



**Figure 5 - 1: Nationality of Tower Visitors**

### 5.1.2 Survey Demographics

Survey demographics are based upon those individuals, families, and etc. that were asked to complete a survey. The demographics encompass a representative, unbiased sample of the general visiting population. Most candidates who completed questionnaires were English speaking, or received help from a companion. So, the categories for demographics primarily represent the English-speaking population who visited "Hands on History." Figure 5 - 2 shows the breakdown of visitors who completed surveys.

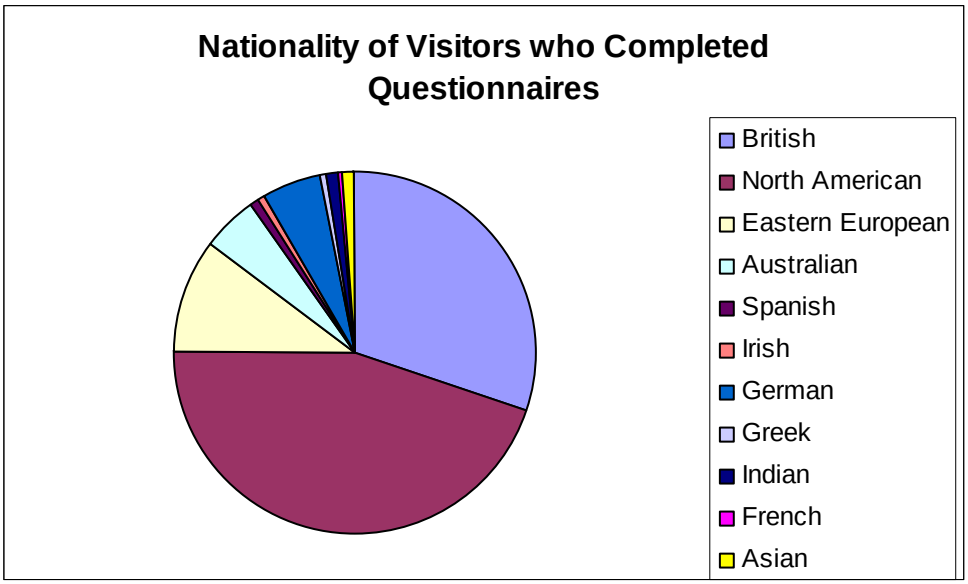



**Figure 5 - 2: Survey Demographics**

## *5.2 Survey I/II Questions 1-5*

### 5.2.1 Question 1

**What type of group did you visit "Hands on History" with?**

Results from this question suggest that the Education Centre achieved its goal in attracting a large number of families to the "Hands on History" exhibit. The breakdown of responses to Question 1 can be seen in Figure 5 - 3.

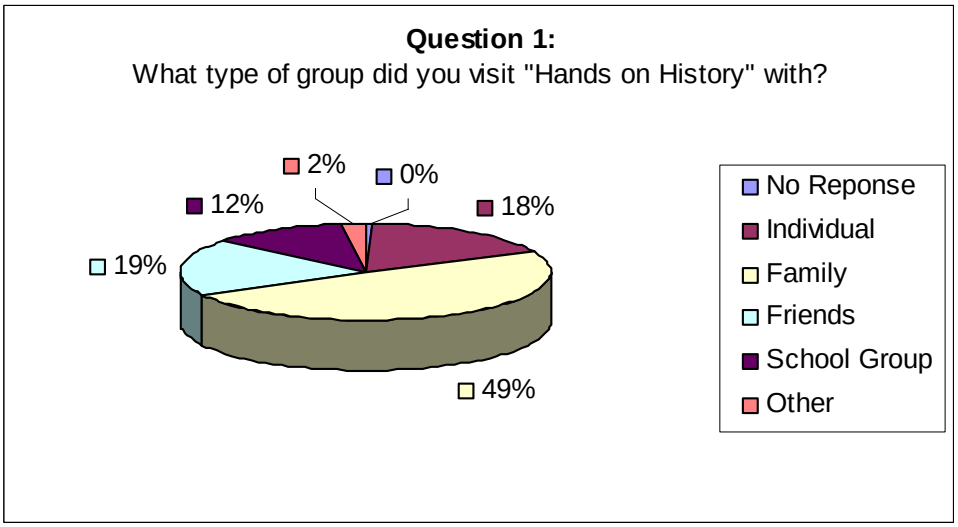



**Figure 5 - 3: Survey I/II Question 1 Analysis**

However, since families were more willing to complete surveys, a bias may exist in the analysis. In any case, the data very accurately represents the people visiting the exhibit. The results from this survey were supported by the ant-trailing observations. Informal observations, along with ant-trails suggest that the family was the most common group to visit the "Hands on History" exhibition. Since this exhibition was designed with the intent of maximizing parent-child interaction, the turnout may be considered successful. However, it must be kept in mind that this was partially attributed to the family being the most frequent visitor group to "Hands on History." This information was entirely based upon our observations conducted during our research over the seven-week period.

### 5.2.2 Question 2

**Do you enjoy history?**

As discussed previously, this question was used to gauge the initial interest level of visitors prior to their experience with the "Hands on History" exhibit. The results indicate that the majority of the people that enter the exhibit have a positive interest in history and therefore, it was implied that visitors also had an interest in the subject matter presented in "Hands on History." Shown below, Figure 5 - 4 displays the numbers of people that enjoy history, those that do not enjoy history, and those that were neutral to the subject.

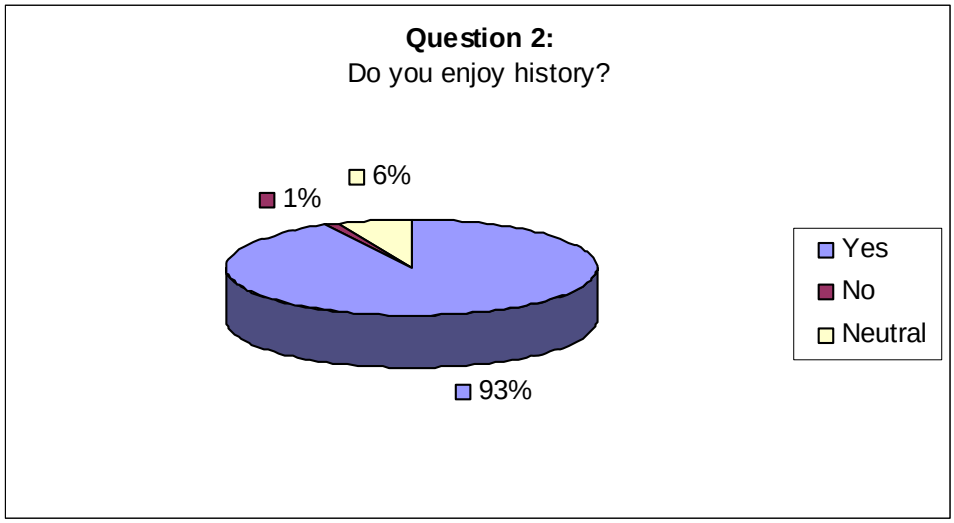



**Figure 5 - 4: Survey I/II Question 2 Analysis**

These results seem reasonable, as people would not be visiting HM Tower of London if they did not have an interest in history. It was evident and understandable that the vast majority of people come to visit "Hands on History" have this preexisting interest in history.

### 5.2.3 Question 3

**How educational did you find the "Hands on History" exhibit?**

The pie graph displaying the results for this question can be seen below in Figure 5 - 5.

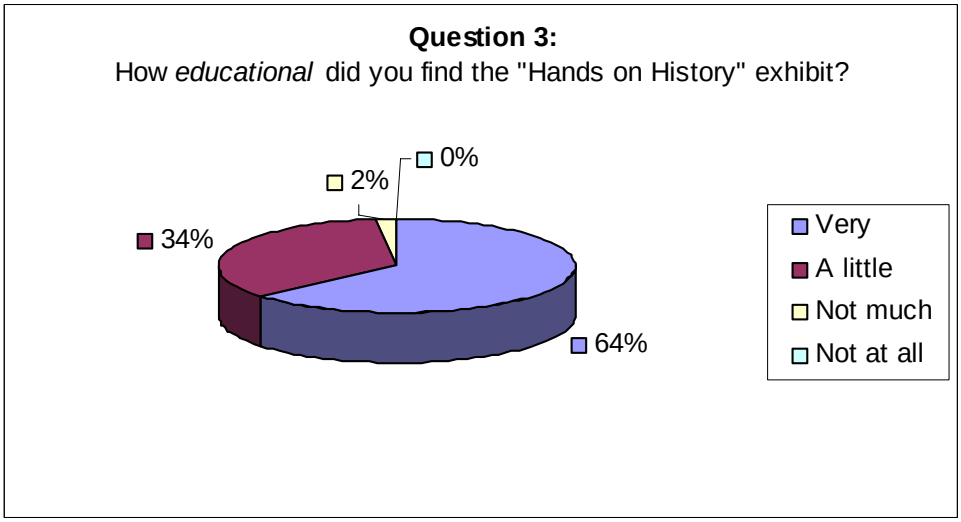



**Figure 5 - 5: Survey I/II Question 3 Analysis**

The results of this question show that the majority of visitors (98%) either responded "Very" or "A little" to the educational value of the exhibit. More so, 64% of those surveyed answered that they found

the exhibit “Very” educational. It was taken into account that people agreeing to take the time to answer the survey often displayed a liking for the exhibit. People that did not enjoy their experience may simply have been in rush to leave the exhibit, thus limiting the representative sample pool. Therefore, 98% may be a very high positive response rate, and realistically would be lower if every person took the time to answer the survey.

### 5.2.4 Question 4

**How *interesting* did you find the “Hands on History” exhibit?**

The pie graph displaying the results for this question can be seen below in Figure 5 - 6.

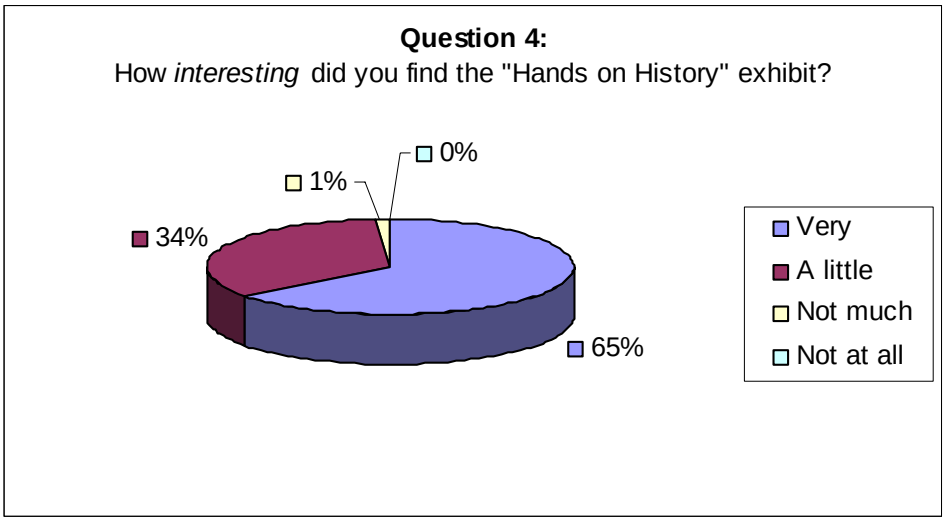



**Figure 5 - 6: Survey I/II Question 4 Analysis**

The analysis for this question was extremely similar to that of Question 3. Approximately 99% of people found the exhibit interesting on some level. The ant-trails confirmed the reliability and validity of these types of survey questions.

| Group Type | Question 3 | Question 4 |
|---|---|---|
| **Individual** | **Total** | **42** |
| Very | 71% | 76% |
| A little | 29% | 24% |
| Not much | 0% | 0% |
| Not at all | 0% | 0% |
| **Family** | **Total** | **114** |
| Very | 68% | 64% |
| A little | 32% | 35% |
| Not much | 0% | 1% |
| Not at all | 0% | 0% |
| Friends | **Total** | **43** |
| Very | 51% | 56% |
| A little | 44% | 44% |
| Not much | 5% | 0% |
| Not at all | 0% | 0% |
| School Group | **Total** | **26** |
| Very | 65% | 65% |
| A little | 27% | 27% |
| Not much | 8% | 8% |
| Not at all | 0% | 0% |

**Table 5 - 1: Question 3 & 4 Age Group Breakdown**

Table 5 - 1 shows a comparison in response between questions 3 and 4 and is broken down by age brackets. This comparison allows for a visualization of the correlation between age brackets.

### 5.2.5 Question 5

**How did the "Hands on History" exhibit compare to other exhibits at HM Tower of London?**

This qualitative question was used to determine how the interactive exhibit, "Hands on History," compared to other more traditional exhibits at HM Tower of London. A visualization displaying the answers to this question can be seen in Figure 5 - 7.

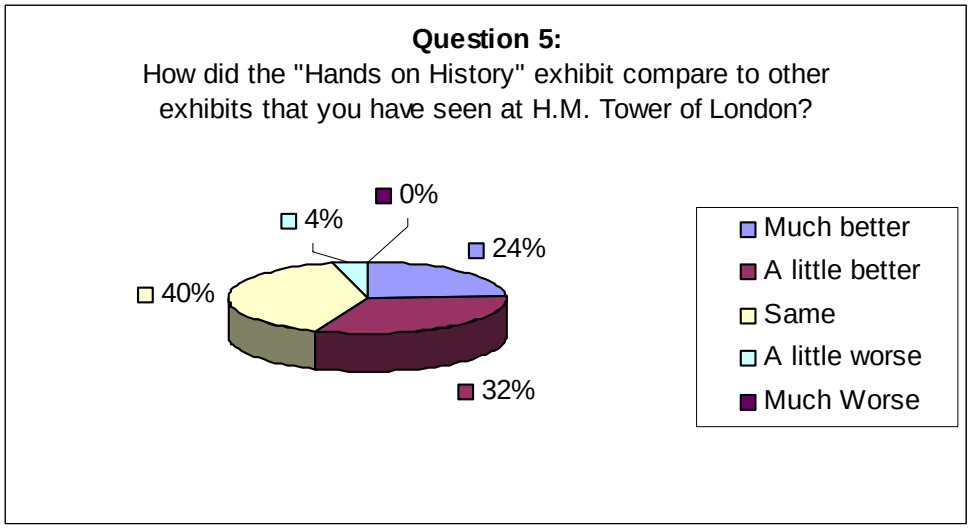



**Figure 5 - 7: Survey I/II Question 5 Analysis**

Answers to this question were primarily positive as approximately 56% of surveys said that "Hands on History" was either "Much better" or "A little better" than other exhibits that they have seen at HM Tower of London. This data supports the conclusion that hands-on approaches are a more effective method of conveying information for visitors. Additionally, 40% of surveys said that the exhibit was the "Same" as other exhibits at HM Tower of London. Overall, this information confirms that the exhibit was a success based on its unique display styles.

## *5.3 Survey I Questions 6-7*

Survey I differed from the other questionnaires in that it contained open-ended questions, allowing visitors to specifically identify the sub-exhibits which they felt strongly about. As a reminder, those questions pertain to interest and educational value. The breakdown of responses shown below derived from Table K - 1: Most Common Responses in Appendix K: Common Response in Surveys.

### 5.3.1 Question 6

**What was the most educational part of the exhibit?**

As stated above, responses for this open-ended question contribute little to our quantitative data until shown in a manner such as the graph Figure 5 - 8, below.

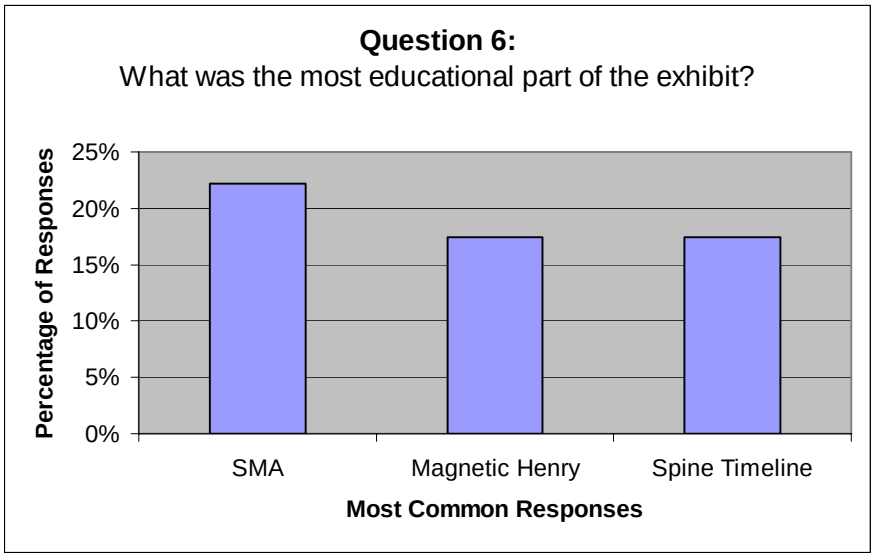



**Figure 5 - 8: Survey I Question 6 Analysis**

This chart shows the top three responses for educational sub-exhibits. The exhibit holding the sword, mail and armour ["SMA"], was the most educational. It was interesting to see that this was the most educational exhibit among responses because when compared to the information in Figure 5 - 18, "SMA" was not read as often as it was interacted with. The spine contains more literature than any other sub-exhibit and can be concluded to be one of the most educational sections, provided a visitor took the time to read it. The "Magnetic Henry", according to the ant trails, was more often read than interacted with. As for the "SMA" exhibit, the information from ant trailing indicates a different trend. More people were observed interacting than reading, which implies that the level of education was not entirely dependent on the amount of literature available, and that learning through other senses was just as important.

### 5.3.2 Question 7

**What was the most interesting part of the exhibit?**

Per the explanation above, a similar chart below (Figure 5 - 9) compares the most common responses concerning visitors' interest.

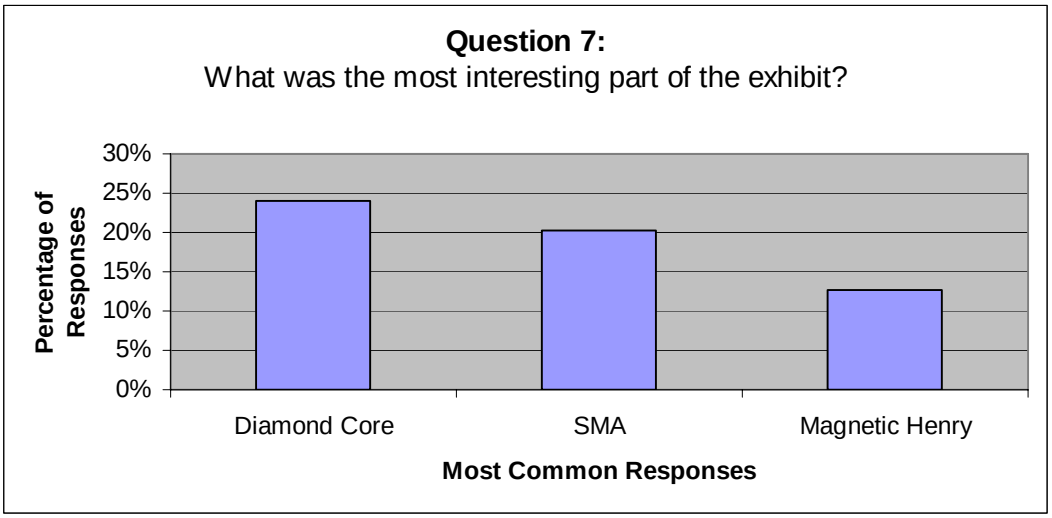



**Figure 5 - 9: Survey I Question 7 Analysis**

The above chart now shows the three most interesting exhibits. The Diamond Core was rated most interesting by mention, and can be seen attracting large numbers of people, according to ant trailing research. The "SMA" sub-exhibit was again at the top of this list as it was a popular exhibit, not surprisingly. Again, the "Magnetic Henry," whose validity was justified by the ant-trailing data, appears again.

## *5.4 Survey II Questions 6-9*

In questions 6, 8 and 9 of Survey II, a series of "yes or no" questions were asked in order to understand how people felt about the atmosphere of the exhibit; also, they were used to determine the level of interaction with the hands-on attractions. The responses to these questions were tallied and are analyzed and displayed below. Question 7 was intended to address the effectiveness of advertising that was put into the exhibit. While the attempt to market the "Hands on History" exhibition to the public has been less than extensive, it was interesting to learn the number of people aware of it before visiting the Tower.

### 5.4.1 Question 6

**Did you feel crowded in the "Hands on History" exhibit?**

This question was largely dependent on the individual flow patterns for the days that the survey was administered. Due to the varying numbers of visitors to HM Tower of London on a daily basis, this

question serves as a general method to determine if “Hands on History” was set-up in a spatially efficient manner. The analysis for this data can be seen in Figure 5 - 10.

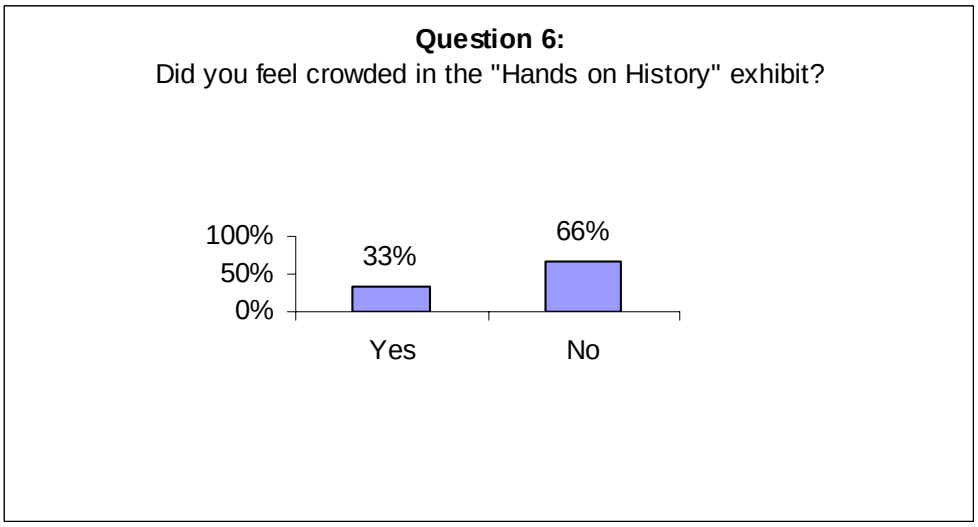



**Figure 5 - 10: Survey II Question 6 Analysis**

This information shows that on in general, the majority of people who completed questionnaires do not feel crowded during their time visiting “Hands on History.” This was positive information to provide the sponsor, as one of her concerns was that the physical space of the exhibit leads to people feeling uncomfortably crowded. Notably, surveying was increasingly difficult the more crowded and busy the exhibit became. Also within the context of visitor flow, was the physical path by which all visitors are directed, which works to the benefit of the “Hands on History” exhibit. A short section will also be devoted to simple observation of the effectiveness of directing traffic to the top floor of the museum.

The data collected from this question was organized and compared to the count of people who were entering the exhibit while the surveys were being taken (see Table 5 - 2). There was no indisputable correlation that emerged to indicate when people began to feel crowded. There was a partial trend indicating the anticipated results; the lower the number of people entering the exhibit at any given time, the fewer survey responses indicating crowding occurred. However, this was not always the case. A possible explanation was that, in busier times, people who felt crowded refused the survey in an effort to leave quickly; consequently, those people who did not feel crowded took the time to fill out the survey.

| Date | Total surveys | "Yes" to Question 6 | % "Yes" to Question 6 | Avg. people per hour |
|---|---|---|---|---|
| 17/03/2005 | 30 | 3 | 10 | 366 |
| 19/03/2005 | 47 | 5 | 11 | 521 |
| 21/03/2005 | 24 | 3 | 13 | 918 |
| 23/03/2005 | 19 | 3 | 16 | 725 |
| 31/03/2005 | 23 | 4 | 17 | 579 |
| 06/04/2005 | 15 | 4 | 27 | N/A |
| 30/03/2005 | 24 | 9 | 38 | 827 |
| 22/03/2005 | 21 | 8 | 38 | N/A |
| 29/03/2005 | 18 | 9 | 50 | 775 |

**Table 5 - 2: Comparison of Question 6 to Numbers of People**

### 5.4.2 Question 7

**Prior to your visit, were you aware that HM Tower of London had an interactive, hands-on exhibit?**

This question was incorporated on the survey at the request of the sponsor, Bridget Clifford. It was Bridget Clifford's impression that very few people were aware of the "Hands on History" exhibit prior to their visit to HM Tower of London. Results, displayed below in Figure 5 - 15, show that just 13% of visitors to the exhibit were aware of its presence prior to their visit. These numbers were realistic as HM Tower of London does not have patrons that re-visit the museum on a regular basis (Bridget Clifford, 2005). A victim of its own success, HM Tower of London attracts large groups of tourists that were not aware of the daily happenings at the castle prior to visiting (Bridget Clifford, 2005). With this in mind, 13% was a surprising percentage of people that were aware of the interactive exhibit; this shows that a small percent, people may actually be coming to enjoy the interactive exhibit, rather than simply observing the exhibit during their tour in the White Tower.

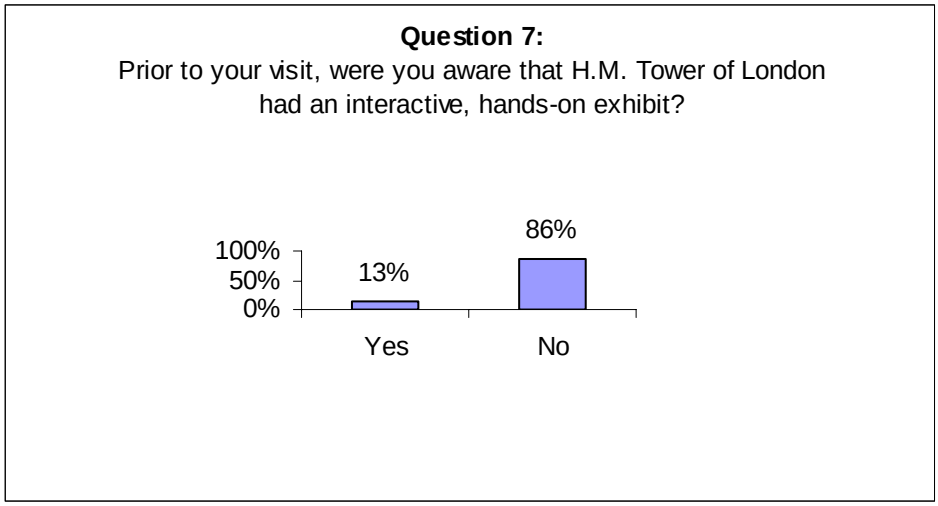



**Figure 5 - 11: Survey II Question 7 Analysis**

### 5.4.3 Question 8

**Did you participate in interactive sections of the exhibit?**

A pie graph showing the percentage of people that participated in the interactive components of the exhibit can be seen in Figure 5 - 12. Results show that 76% of visitor groups surveyed took part in interactive portions of the exhibit. Visitor groups surveyed were individuals, couples, families, friends, or school groups. Therefore, the actual numbers of "people" that took part in the interactive sub-exhibits would most likely be greater than 76%. These numbers show that most people were taking advantage of the hands-on sub-exhibits. Again, although these numbers may be swayed slightly by the pool of people surveyed, it was unlikely that they would be altered enough to seriously affect the analysis of the data. The results to this question can be compared to the results of Survey II, Question 9, to see whether people were simply entertained by being able to handle things, or if they take the time to read the labels and truly learn something from the experience.

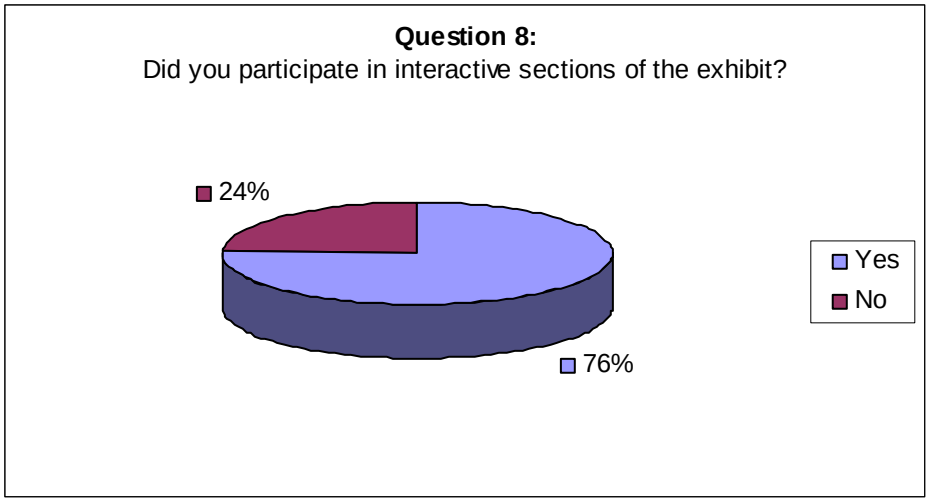



**Figure 5 - 12: Survey II Question 8 Analysis**

### 5.4.4 Question 9

**Did you read the instruction labels for the interactive sections of the exhibit?**

It was informally predicted by the sponsor, the project group, and the educational staff that the majority of people did not read the labels. The analysis for these results can be shown below in Figure 5 - 13. As seen below, 71% of people read the labels that went with those activities. This was a very high turn over for both reading and interacting. It does seem highly unlikely that this quantity of people took the time to read and interact with the entire exhibit, however when considering that people may have just interacted with one or two of the exhibits, and read the labels for those, these numbers become much more feasible.

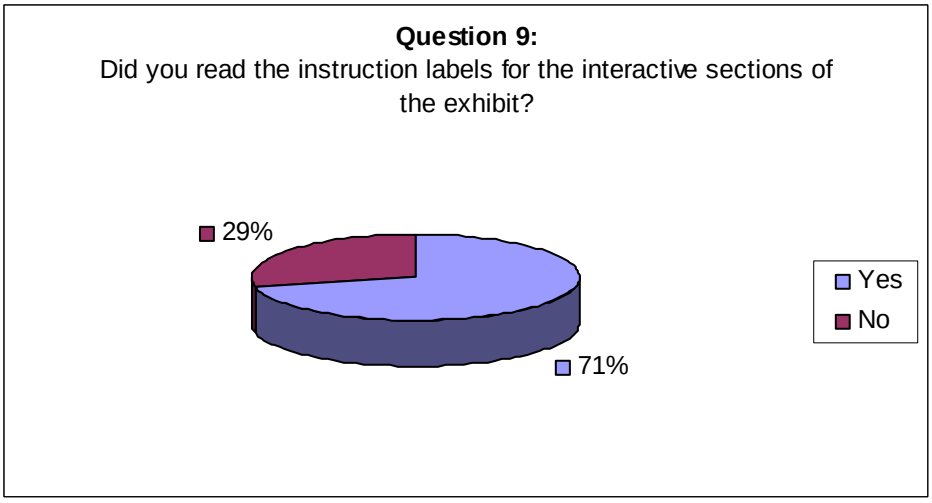



**Figure 5 - 13: Survey II Question 9 Analysis**

As can be seen in the table below, there were a number of people who did not interact with the hands on portions of the exhibit, but did still read the labels for them. These were likely the parents of children who read the labels to keep busy while their children made use of the interactive portions of the exhibit. Out of the people who didn't interact with the exhibit, 58% read the labels on them anyway. This was a good sign; even if people were not able to or interested in participating in the interactive portions, they can still be engaged with the textual information that was made available at those sub-exhibits.

| *Answer Correlation: Interaction and Label Reading* | | | |
|---|---|---|---|
| | Interacted? | | Read? |
| Answer "Yes" | 92 | Answer "Yes" | 72 |
| | | Answer "No" | 20 |
| | | | |
| Answer "No" | 31 | Answer "Yes" | 18 |
| | | Answer "No" | 13 |

**Table 5 - 3: Question 8 & 9 Comparison**

Table 5 - 3 allows tracking the responses for visitors who gave specific answers. This chart gives some understanding of how people behave in the exhibition.

## *5.5 Ant-trail Observations*

The ant-trail observations have proven to be a very useful and effective manner in which to collect and analyze data to determine the success of the sub-exhibits of "Hands on History." As information concerning each sub-exhibit was recorded, the data collected showed recognizable patterns. Below, some identifiable patterns of interest for the various "groups" of visitors appear. For terminology definition, sub-exhibits were the various "stations" of "Hands on History." The sub-exhibits were analyzed in two groups: non-interactive sub-exhibits and interactive sub-exhibits. By making this distinction it was more useful and effective to analyze correlations among the data collected.

### 5.5.1 Non-Interactive Sub-exhibits

Those exhibits that were considered "non-interactive" were those primarily along the centre wall spine, which did not allow interaction with the material; however, there was one non-interactive sub-exhibit that was intertwined with interactive sub-exhibits along the outside wall. These non-interactive portions of "Hands on History" were primarily objects behind glass with corresponding labels describing the contents. The portions along the spine, follows a time-line of the history of HM Tower of London. This set-up can be seen in Figure 2 - 4. The analysis related to the times recorded at these

parts of the exhibit can be seen below in the subsequent charts and text. In the "Hands on History" exhibition there were twelve sub-exhibits deemed non-interactive: Children in Armour, AD 40, Norman Helmet, AD 1300, DeBeers Case 1, DeBeers Case 2, Inscription and Nail, Helmet and Breastplate, Replica Jewels, AD 2000, Tower Power, Yeoman Warder.

Figure 5 - 14, below, shows the amount of time that groups being trailed spent at the first non-interactive sub-exhibit. The bar graph is divided into the four groups of visitors ant-trailed: individuals, couples, families, and friends. Figure 5 - 14 analyzes each group or individual that was ant-trailed. Those that passed by "sub-exhibit 1: Children in Armour" without stopping were recorded as spending 00:00 (min: sec) at the exhibit. The charts for all twelve of the non-interactive sub-exhibits can be viewed in Appendix H: Ant Trail Analysis of Interactive Sub-exhibits.

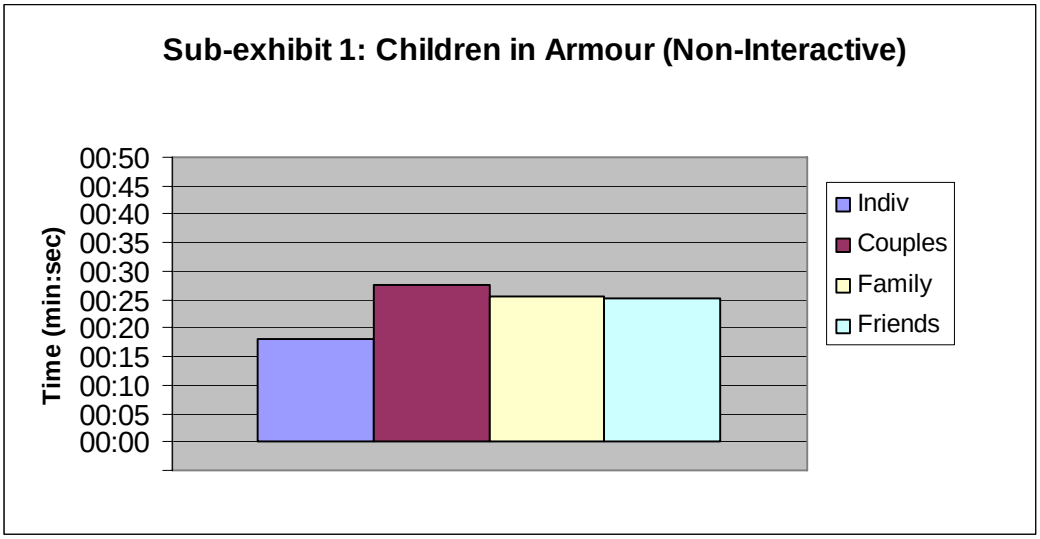



**Figure 5 - 14: Time spent at sub-exhibit 1 by various groups**

## 5.5.2 Interactive Sub-exhibits

Those exhibits that were considered "interactive" were those that directly involved the participation of the museum's patrons. Unlike the non-interactive portions that follow a general theme, the interactive parts were a diverse collection of subject matter. In the "Hands on History" exhibition there were eight sub-exhibits deemed interactive: Inscription Rubbings, Norman Arch, Brass Rubbings, Diamond Interactive, Magnetic Henry, SMA, Large and Small Armour, and Menagerie.

Figure 5 - 15, below, shows the average amount of time that groups being trailed spent at the first interactive sub-exhibit, "Inscription Rubbings". Again, the bar graph was broken into the four ant-trail categories: individuals, couples, family, and friends. The completed charts for the eight interactive sub-exhibits can be viewed in Appendix H: Ant Trail Analysis of Interactive Sub-exhibits.

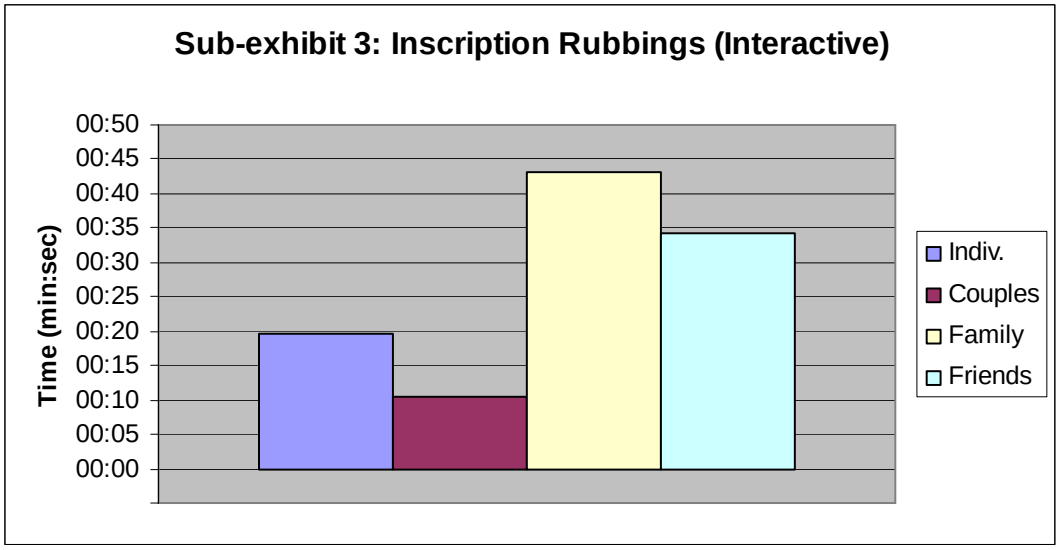



**Figure 5 - 15: Brass Rubbings Ant-Trail Analysis**

### 5.5.3 General Trends and Analysis of Ant-trailing Data

Several conclusions were drawn from the average time spent at the twenty interactive and non-interactive sub-exhibits through "Hands on History." The figure below, Table 5 - 4 shows some general conclusions from the ant-trailing data.

| | **Breakdown of Average Time Spent at types of Exhibits** | |
|---|---|---|
| | *Non-Interactive sub-exhibits* | *Interactive sub-exhibits* |
| **Individuals** | ***00:07*** | ***00:10*** |
| **Couples** | ***00:14*** | ***00:10*** |
| **Family** | ***00:08*** | ***00:33*** |
| **Friends** | ***00:06*** | ***00:20*** |

**Table 5 - 4: Average Time spent at exhibit by groups**

Through ant trailing, it was evident that couples spend the most time at the non-interactive exhibits; this was true for each of the twelve sub-exhibits. Moreover, couples were the visitor group that spent, on average, more time at the non-interactive sub-exhibits than the interactive sub-exhibits. Couples, on

average spent 00:14 seconds at the non-interactive sub-exhibits opposed to 00:10 seconds at the interactive portions of the exhibition. This data shows that couples prefer the more traditional, glass-cased style of exhibit. It was also important to note that the group that spent the second most time was the family unit (00:08 seconds), followed by individuals (00:07 seconds) and friends (00:06 seconds). It should be noted that these times were substantially less than that of the couples' representative group.

Family groups visited the interactive sub-exhibits the longest period of time. Families, on average spent 00:33 seconds at the interactive portions of "Hands on History." Friends, couples, and individuals had average times spent at the interactive sub-exhibits of 00:20 seconds, 00:10 seconds, and 00:10 seconds, respectively. With this information, it was reasonable and accurate to conclude that the interactive portions of "Hands on History" were successful in attracting families, as hypothesized in the initial problem statement from the Royal Armouries.

The conclusion that "Hands on History" was successful in attracting and complementing the family group was also supported by data collected concerning the total time spent in the exhibit. Below, in Table 5 - 5, variances are shown in the amount of time the four different visitor groups spend in "Hands on History."

| | Avg. Total Time Spent in Exhibit (min: sec) |
|---|---|
| **Individuals** | ***02:11*** |
| **Couples** | ***03:46*** |
| **Families** | ***06:10*** |
| **Friends** | ***03:49*** |

**Table 5 - 5: Total Time in Exhibit**

The Royal Armouries had hoped that this exhibit would be oriented towards learning among the family unit. It should also be taken into account that although individuals spend significantly less time in the exhibit, it was understandable as they were only responsible for themselves. Simply because individuals spend less aggregate time, does not show that the exhibit was unsuccessful for their demographic bracket; they may retain information more rapidly as they were traveling alone.

Additionally, it was useful to analyze the ant-trail data to determine which exhibits were the most successful in initially attracting people; it was also observed how much time groups spend at the various sub-exhibits, previously called the *holding power* of the sub-exhibits. Generalized bar graphs can be seen below in Figure 5 - 16 and Figure 5 - 17 that summarizes the overall percent of visitors and the average time spent at the sub-exhibits versus the visitor groups. Shown in red are the interactive sub-exhibits, and non-interactive in blue.

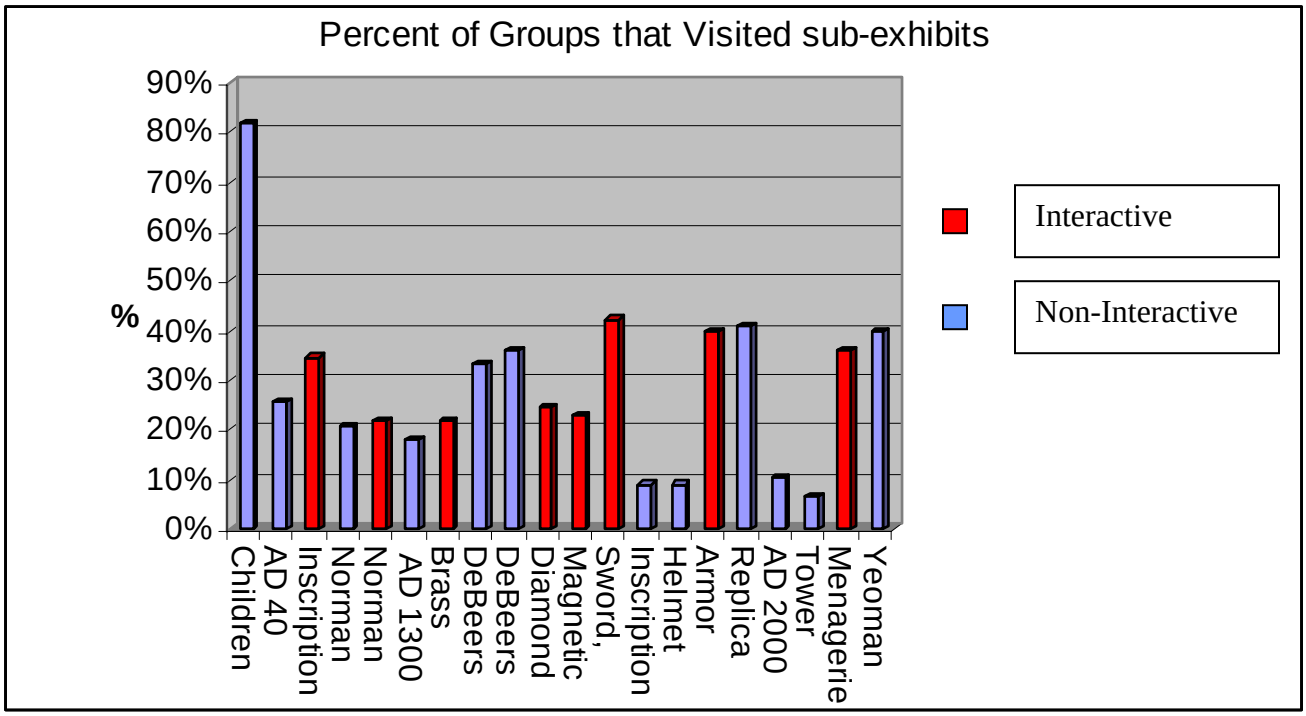



**Figure 5 - 16: Groups that visit sub-exhibits (percentage)**

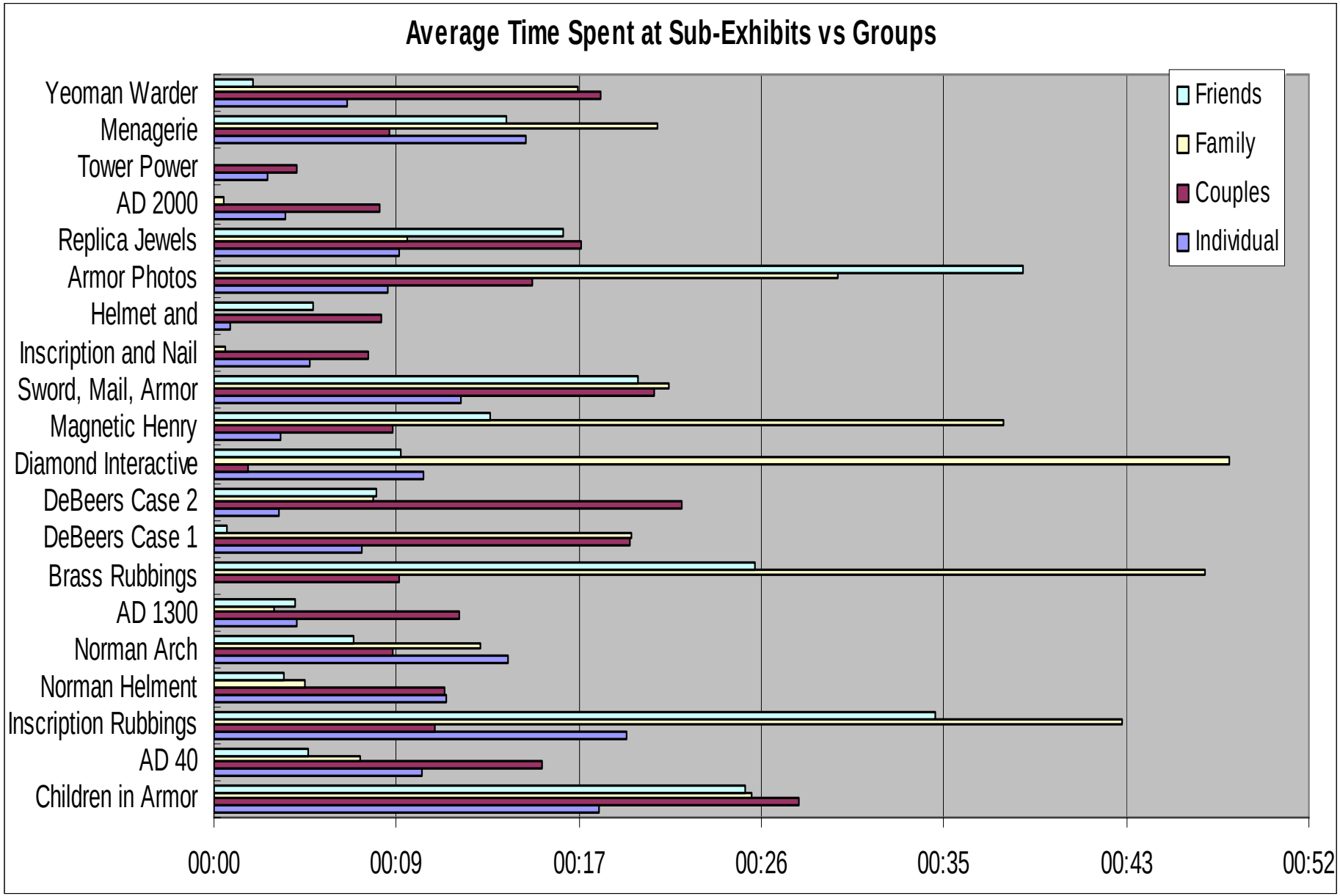



**Figure 5 - 17: Average time spent by exhibit for each group**

This data and analysis shows that the "Inscription Rubbings" was the exhibit where the most time was spent, with an average time per group of 00:29 seconds. This conclusion was not surprising as this exhibit was the third sub-exhibit in the exhibition and the first interactive exhibit. Through observation it was noted that people regularly queue around the "Inscription Rubbings." For measuring purposes, queue time was included in the total calculated time spent at a sub-exhibit; it incorporated people's willingness to wait for their opportunity to use a sub-exhibit. If time had been counted only for the visitor groups' actual interaction with the exhibit, important time spent would have been ignored. The success of this sub-exhibit can also be attributed to its location at the beginning of "Hands on History" as 35% of groups ant-trailed observed "Inscription Rubbings." People, after having gone through the White Tower without any interaction, were often excited to be involved with an exhibit.

A chart summary of each sub-exhibit's overall visitor attraction rate and holding power can be seen below in Table 5 - 6. The charts corresponding to the four different ant-trailed groups can be seen in Appendix L: Percent Visited vs. Holding Power of Sub-exhibits.

| *Exhibits* | **% Visited** |
|---|---|
| **Children in Armour** | 82% |
| **SMA** | 42% |
| **Replica Jewels** | 41% |
| **Yeoman Warder** | 40% |
| **Large and Small Armour** | 40% |
| **Menagerie** | 36% |
| **DeBeers Case 2** | 36% |
| **Inscription Rubbings** | 35% |
| **DeBeers Case 1** | 33% |
| **AD 40** | 26% |
| **Diamond Interactive** | 24% |
| **Magnetic Henry** | 23% |
| **Brass Rubbings** | 22% |
| **Arch** | 22% |
| **Norman Helmet** | 21% |
| **AD 1300** | 18% |
| **AD 2000** | 10% |
| **Inscription and Nail** | 9% |
| **Helmet and Breastplate** | 9% |
| **Tower Power** | 6% |

| *Exhibits* | **Holding Power (min:sec)** |
|---|---|
| **Inscription Rubbings** | 00:29 |
| **Children in Armour** | 00:25 |
| **Brass Rubbings** | 00:25 |
| **Large and Small Armour** | 00:25 |
| **Diamond Interactive** | 00:22 |
| **Magnetic Henry** | 00:19 |
| **SMA** | 00:19 |
| **Menagerie** | 00:15 |
| **DeBeers Case 1** | 00:14 |
| **Replica Jewels** | 00:13 |
| **Yeoman Warder** | 00:13 |
| **DeBeers Case 2** | 00:12 |
| **Arch** | 00:10 |
| **AD 40** | 00:08 |
| **Norman Helmet** | 00:06 |
| **AD 1300** | 00:06 |
| **Helmet and Breastplate** | 00:03 |
| **AD 2000** | 00:03 |
| **Inscription and Nail** | 00:02 |
| **Tower Power** | 00:01 |

**Table 5 - 6: Attractiveness vs. Holding Power**

**Interactive sub-exhibits**

**Non-Interactive Sub-exhibits**

The next most successful exhibits according to average time spent per visitor group were "Brass Rubbings," "Children in Armour," and "Large and Small Armour," all of which recorded average time spent of 00:25 seconds. Looking at the characteristics of the data organization, it was important to notice that the interactive sub-exhibits have, for the most part, higher average time spent. However, the most successful exhibits in regards to attracting visitors initially were more balanced between interactive and non-interactive. This may show that, although initially interesting, non-interactive sub-exhibits lack the necessary qualities to maintain the visitors' interest and attention.

The "Brass Rubbings" sub-exhibit was successful in attracting people. While 35% of ant-trailed visitors stopped at the "Inscription Rubbings," only 22% of visitors stopped at the "Brass Rubbings." From an observational standpoint, the slightly lower average time spent may be due to the fact the sub-exhibit was located further along in "Hands on History," or the "Brass Rubbings" may have not have attracted as many visitors because people had already completed a similar exercise earlier in the exhibition.

"Children in Armour's" success, through observation, can largely be attributed to the fact that it was the first sub-exhibit in "Hands on History." Its location at the entrance influenced approximately 82% of ant-trailed visitors to examine this sub-exhibit. The "Large and Small Armour" sub-exhibit was attractive to many visitors: 40% of ant-trailed visitors stopped to observe, with the majority of them taking photographs.

Those sub-exhibits that were the least effective in terms of attracting visitors and holding their interest were "Tower Power," "Inscription and Nail," "Helmet and Breastplate," and "AD 2000." These exhibits had values for percent of visitors of 6%, 9%, 9%, and 10%, respectively; also, these exhibits had average time spent values of 00:01 sec, 00:02 sec, 00:03 sec, 00:03 sec, respectively. These values were significantly lower than those values of more successful sub-exhibits of "Hands on History." Although these sub-exhibits were primarily ineffective in attracting people and holding their attention for extended periods of time, they were partially successful for the couples ant-trailed. For "Tower Power," "Inscription and Nail," "Helmet and Breastplate," and "AD 2000," couples" visited the respective exhibits 19%, 24%, 19% and 8% of the time. More significantly, on average they spent 00:04 sec, 00:07 sec, 00:08 sec, 00:08 sec at the respective sub-exhibits.

Although it was very important to understand the average time spent at the sub-exhibits, it was also necessary to analyze *how* visitors interact at the sub-exhibits. In order to analyze this information, we created the chart below, Figure 5 - 18.

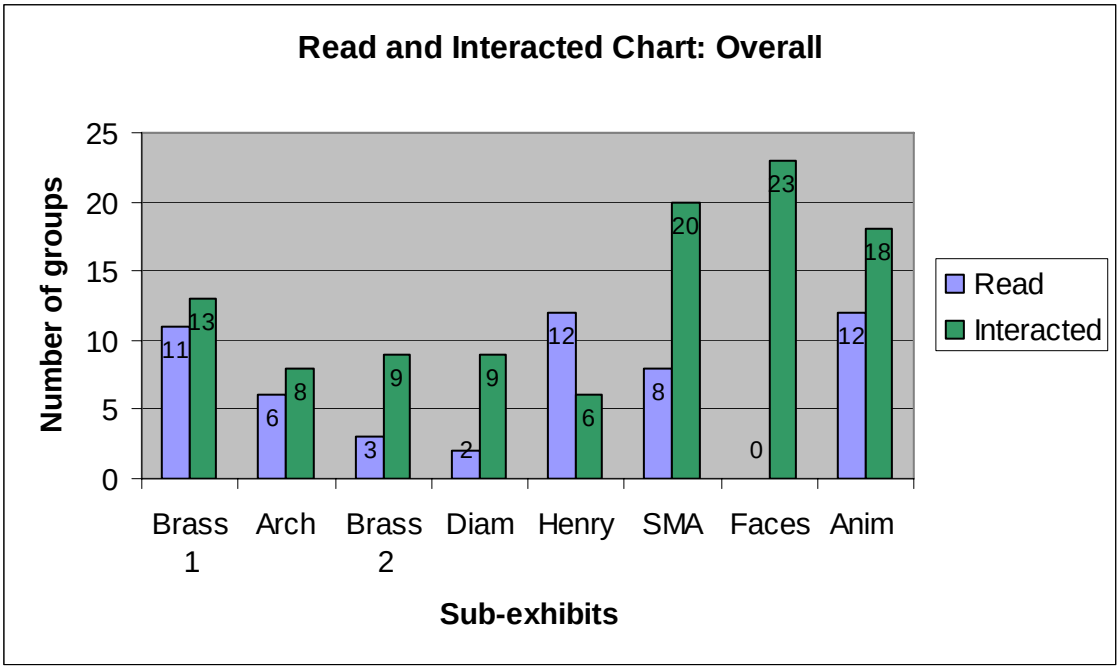



**Figure 5 - 18: Interactive Exhibit Participation**

This chart delves deeper into the educational value of the various sub-exhibits. It simply compares whether people interacted with the sub-exhibits, read the labels of the sub-exhibits, or a combination of the two. This observational method of research allowed us to draw conclusions concerning which exhibits were truly the most educationally effective.

For instance, although the "Large and Small Armour" sub-exhibit was successful according to the aforementioned analysis, incorporating percent of visitors and holding power; Figure 5 - 18 shows that this information may be partially misleading. Although "Large and Small Armour" was the most utilized interactive sub-exhibit, primarily used to take photographs, it lacked the ability to draw attention to its accompanying label. Although many museum visitors found "Large and Small Armour" appealing, people did not take a significant amount of information away from this sub-exhibit.

As shown, "Magnetic Henry," "Menagerie," and "Inscription Rubbings" were the most successful interactive exhibits with respect to attracting people to read the accompanying labels. Ideally, an affective interactive exhibit allows people to educate themselves through a combination of the hands-on activity supplemented by the text label. According to this theory, "Menagerie" may be considered the most effective sub-exhibit in "Hands on History" to adequately combine a hands-on activity while maintaining a transfer of the desired educational information. Some activities adapt themselves better to maximizing a combination of hands-on activity with the reading of the material on labels. Through our observations, we have found that people enjoy intellectual, puzzle-like activities similar to "Magnetic Henry" and "Menagerie." The team has concluded that when people feel as though they were

attempting to achieve a final goal, whether it was correctly dressing Henry or guessing which animal lies under the tabs, they were more willing to read the textual information.  This observation is supported by the data collected.

# 6. Recommendations

Part of our methodology has described how to physically create an effective hands-on learning experience based on the information presented in the "Hands on History" exhibition. The other operation in our methodology details how the information concerning interest and education must be gathered. Surveys alone have been found, through background research, to be biased and flawed, so another method was inherently required in conjunction with the surveys to prove their validity. A milestone in this project was the creation of the ant trail worksheets; the worksheets allowed us to quantify observational data. Survey results cannot prove anything alone, and that no amount of surveys will truthfully allow for generalizations of the visitors. Through the application of the ant-trailing and surveying, the data collected was corroborated by two vastly different research methods. As had been anticipated, these two techniques supplemented each other; both methods revealed similar patterns and conclusions. Ant trailing not only shows us that the survey questions were answered honestly, but also allows to the formation of hypotheses about the exhibitions' arrangement and content.

Ant trailing can be a very useful too for researchers, especially when analyzing museum content. Surveys will record non-objective information and ant trails will support them by statistically organizing observational data. Thanks to the creation and implementation of this model, future exhibitions will be more successful than in the past.

Hands-on learning was proven through research to be an effective and essential method in which to display information. Additionally, non-interactive sub-exhibits were useful in accompanying the interactive portions of an exhibition. The team advises that for future exhibits, a hands-on exhibition maintains a reasonable amount of non-interactive sub-exhibits for those that prefer the more traditional setup. Moreover, the most effective manner in which to present an appropriate hands-on experience in the White Tower would be through the installation of hands-on sub-exhibits throughout all three floors. Though this would take considerable collaboration with Historical Royal Palaces (HRP), it would not only benefit the Royal Armouries Educational Centre and HRP, but also the entire visitor experience of HM Tower of London. Though this is a complicated request, a hands-on experience balanced throughout the White Tower, rather than an exhibit solely dedicated to "Hands on History" would be more effective.

After visiting the Victoria and Albert Museum (V&A), we received a different perspective on the manner in which to present hands-on experiences. The V&A had interactive sub-exhibits throughout the entire museum, thus allowing people to relate traditionally displayed material to interactive material. Rather than having no direct connection between interactive sub-exhibit "A" located adjacent to non-

interactive sub-exhibit "B," the V&A encourages people to observe both sub-exhibits. This was completed by putting similar material on each sub-exhibit, thereby encouraging people to draw comparisons between the two, thus reiterating the desired material. Through this relationship between sub-exhibits people utilize the material presented in each. This combination of exhibit types will keep the visitor interested while also meeting the goals of the museum staff and educators. Though it was understood that the V&A often works with a much more substantial budget in its design of museum exhibits, we believe that HM Tower of London, over time, would be able to employ a similar design set-up. This incorporation of visitor interactive segments would probably take a year or two to fully develop; however, it would improve the visitor experience through combining factual information with an experience that will spark the visitors' interest to delve further into the material presented. This balance of exhibition types would attract and involve a more diverse demographic breakdown of people.

Although all of the sub-exhibits display different information, there were several presentation formats that were utilized to present the material. These formats vary in size, colour, amount and presentation of text, and placement. There were large freestanding labels, wall labels, and smaller labels behind glass and/or near objects.

The freestanding labels seemed largely ignored by the museum-goers although some take the time to read them. Complaints concerning this label type included the bottom portions of the labels being too low to the floor for the size of the text displayed. There was also an issue with some of the text colour, namely the white text on yellow background, which people found difficult to read. There was also one complaint received that there was too little information for adults, the likely readers of these labels. Although no comments were given about location, through observation it was seen that the placement of the labels seemed to play a role in their lack of use. As these labels complemented the hands-on portions of the exhibit, it was the desire of museum staff that people would utilize the labels to enhance their experience. However, it was observed that due to the freestanding labels being several feet from core of the hands-on sub-exhibits, people often did not use them. The location may have lead to people walking by them, focused on the hands-on portion instead. Parents were often seen standing next to their child as they participated in the hands-on, watching or helping them instead of taking the opportunity to read the labels. Placement of the labels closer to the hands-on might help resolve this issue. We recommend that in the future labels be located in a position closer to eye level. Furthermore, labels should be located for both interactive exhibits and non-interactive sub-exhibits in a location where it is natural to look (i.e. for the "Inscription Rubbings" and "Brass Rubbings" the labels would be better suited directly around the workstations).

The wall labels, on the other hand, seemed to be well received in their respective sub-exhibits. People were observed reading these much more frequently than the freestanding labels. There were no negative comments received on any of the wall labels, the only label category to accomplish this.

The smaller labels behind glass also seemed to be successful. Again, these were more frequently read than the freestanding labels when compared to the wall mounted labels. Because these labels were used primarily on the non-interactive sub-exhibits, there was less traffic around these portions. Considering this situation, it may have been physically more comfortable to read these labels as opposed to the crowded interactive sub-exhibits. The only issue was one comment that they should be directed towards the adult eye level. Although this was a valid concern, as bending over constantly can be uncomfortable, there was only the one comment, and sometimes a less than ideal placement of the label is unavoidable. Those that read the labels liked them to be located close to the display that they complemented. Some of these labels were repeatedly ignored however, regardless of the display content. The labels for the Sword, Mail, and Armour, for example were very often skipped over while people used their time to feel and touch the items. The "Yeoman Warder" portion of the exhibit was often read. This sub-exhibit received several comments saying that the label was generally acceptable, but mainly geared towards adults. This stand-alone display made good use of the space to command attention, was well presented and was well received from visitors. Visitors stated that the complexity and length of the text was not suitable for children. As an initial intention for the entire exhibition, curator Bridget Clifford had hoped to steer the interest towards the family level. The intention was that the parents would interact with their children and explain the history in a more suitable context. We believe that the labels should *not* be entirely directed towards children and that when explaining the history through labels, less is not more.

There were a variety of weaknesses involving the physical arrangement of the exhibition. There were only a few things that were successful with the exhibit display setup. For example, the use of the centre spine to portray the history of the Tower was a clever and economical way to display information by utilizing a great amount of surface area with its serrated design. One suggestion involves making a break in wall at one or more locations, which allows the Wardens to monitor the area more easily while still displaying nearly the same amount of information. More precisely, two or three standing columns can contribute four or more faces to holding information. Obviously if the curator is concerned with maintaining the order that history is introduced to a visitor, such as with a timeline, then the serrated wall will continue to be a worthy option. Additionally, the unfortunate tendency for interactive exhibits to form queues overshadowed, to a degree, their effectiveness, individually and as an exhibition.

Most issues with the "Hands on History" exhibit stem from less than ideal placement of sub-exhibits. By observing how visitors react to the direction of flow and the crowd around them we have identified several manageable issues. The first interactive exhibit encountered was the "Inscription Rubbings" located around the corner of the entrance. Though successful in its attraction, it creates a miserable bottleneck of people that collides with the pathway in the beginning of the exhibit. People were often observed skipping several sub-exhibits in order to pass through the crowd. A queue is certainly expected at each station, so the more popular sub-exhibits need to be relocated to a different place on the floor so that the queuing areas are less damaging to the foot traffic. The next most noticeable obstruction occurs at the "Large and Small Armour" display used for taking pictures. As mentioned earlier, the labels here were rarely seen and the display becomes nothing more than travelers' memorabilia. It stands perpendicular to the foot traffic where visitors do not hesitate to queue for several turns in order to have a picture taken. School groups were especially damaging to the flow near this sub-exhibit; the damage was inflicted on the surrounding media when the queue blocks and often hides the information on the spine. Users push further back to focus on the rather large wooden display and people wait behind them as a courteous gesture to avoid walking in front of a picture being taken. Around this corner a problematic back up begins as visitors can see the pathway, yet refrain from walking by so that pictures may be taken. A simple solution would include turning the display ninety degrees to either side, which will help the back-up problems instantly given there is enough space to back up and take a picture.

Another finding was a large amount of visitor congestion at the "Children in Armour" and "Sword, Mail, Armour" exhibits. The first sub-exhibit, the "Children in Armour" had over an 80% visitation rate, more than double any other. Content and design alone cannot account for these increased rates of visitation. It was possible that people were likely to feel obligated to spend time at the first portion of an exhibit they see, and that turning a corner may have the same effect, creating a second "first exhibit" of sorts. Visitors are also forced to refocus their attention when turning a corner, whereas they can stare directly ahead when they are walking in a straight line. People were often observed spending time at the first sub-exhibit, then paying little attention to the rest of the exhibits in the hall, and then stopping again at the first sub-exhibit they see as they turn a corner. Similar activity was also seen in other exhibits in the Tower of London. We have dubbed this possibility the "Around the Corner" theory. Placing the most important portions of the exhibits in these corners would maximize their potential. The museum determines what is important, whether it is the educational value of the sub-exhibit, or that the material interests visitors. This may cause problems if the exhibit were a time consuming hands-on exhibit, such as the "Brass Rubbings", which tend to bottleneck anyway. Though

this theory will not apply to everyone, as all people react differently to different circumstances and materials, there is evidence to support it among a large percentage of museum visitors.

To conclude the discussion on physical placement for interactive sub-exhibits a simple methodology that will aid in the design of new exhibitions was devised. Interactive exhibits that can host more than one family or entertain a large group of people should not be placed at the beginning of an exhibition or directly around the turn of a corner. Instead they should be placed at the perimeter of the exhibition floor space. This idea extends to a single exhibition with multiple isles and turns and thus, popular, large capacity displays should not be that first exhibit as stated above.

# 7. Conclusion

After fourteen weeks of research and a comprehensive study completed at HM Tower of London, we have arrived at our conclusion with sufficient data, analysis and background. To reiterate the problem statement forwarded to us, Bridget Clifford required an assessment of the effectiveness of the display methods in "Hands on History" in terms of interest and their ability to educate the public. During the course of the assessment, the problem statement was supplemented with several more specific problems, all of which have been addressed in this report.

The "Hands on History" exhibition has been successful considering the budget and time used to create it, and the man-power required for maintenance. The ideas portrayed in the displays throughout the exhibit contributed to its success but also leave room for improvement. Future manifestations that contain hands-on activities will benefit from the physical and content-based recommendations discussed in the prior section.

From the data we concluded that the exhibition has been successful in appealing to all age groups and, most notably, families. The popularity of certain sub-exhibits compared to others clearly outlined what the interests of all groups who visited "Hands on History" were. Based upon the peaks of observed interests, interactive activities should be seen as necessary attractions and important tools for educating the public. However, modernized interactive exhibits are not the pathway to all of a museum's objectives, and should not overpower the atmosphere of a medieval armour-intensive museum.

Through the seven week assessment of "Hands on History" it was found that the exhibit was successful, meaning that it was educational and interesting for people across the demographic spectrum. This report outlines the findings of the exhibit assessment and can be used to help plan or design future hands-on exhibitions.

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# Appendix A: Mission and Organization

The Royal Armouries Museum is a government based organization that was instated to preserve and display the United Kingdom's historical arms and armour. This organisation has three separate locations throughout the United Kingdom in Leeds, Fort Nelson in Portsmouth and at HM Tower of London. The Royal Armouries Museum's mission statement was "to promote in the UK and worldwide the knowledge and appreciation of arms and armour and of the Tower through the collections of the museum and the expertise of staff."

The Royal Armouries Museum does not manage the Tower of London site; that is done by another organization called Historic Royal Palaces. The Royal Armouries is a tenant at the Tower of London, and the collections are kept in the White Tower. The Education Centre is in the Waterloo Barracks building, near the White Tower. It offers a range of opportunities for the students to learn about history, science, art, design, music and more.

**Hands on History**
**A temporary exhibit dedicated to allowing the visitor to have a go**
**2004/05**

## The exhibition

*Hands on History* celebrates thirty years of Education at the Tower of London. The exhibition is the culmination of a three year partnership with DeBeers which has included their part support of a science education post for the Royal Armouries in the Tower, a small exhibition in the Education Centre marking the centenary of the Cullinan mine in South Africa and a return visit of items to their visitor from the Education Department and featuring the work of the department. This exhibition forms the core of the present exhibition. It operates on several levels; using 7 of a set of 14 paintings commissioned for the millennium, and showing the changes to Tower Hill over 2000 years, a timeline forms the central spine. Interlinked are objects from the Education Centre handling collection used to teach aspects of the National Curriculum. The story of education at the Tower in its broadcast sense is also covered here, charting the early tourist attraction and comparing the very different approaches to learning between the nineteenth and twenty first centuries.
An important element of this exhibition is the fact that the sponsor is contributing to the story with interactives supported by their public information department of the Diamond Trading Centre.

Building on the Royal Armouries previous temporary exhibition, *The Knight is Young: Princely Armours and Weapons of Childhood* and the evaluation highlighting the value of low-tech interactives in helping to engage the younger visitor, a radical approach was adopted to provide an experience which engaged younger visitors as much as their elders. A partnership was forged between the curator and the education department. This early collaboration was essential to the success of the venture.

The exhibition spans 3 half-term holidays the Easter holidays and the very busy period between Christmas and New Year, so many family groups will visit during its time-span. It opened to the public on Saturday 23rd October 2004 and immediately attracted much positive support from the children and their parents.

## Why a 'hands-on' Exhibition?

From the start, the desire to integrate exhibit and activity was central to the overall aim of the exhibition. An exhibition celebrating the history of an Education Department had to reflect the ethos of that department. Museums, galleries and historic sites have championed the benefits of active learning in their education departments with the support of organisations like Group for Education in Museums. Engage, the Heritage Education Trust. The reasons are many, but for the Royal Armouries Education Department in the Tower of London can be summed up by the following:

- Adult helpers accompanying schools frequently saying that the classroom activities should be open to others
- Hands-on experience from the Knight is Young commented on during the face to face evaluation carried out during the February half-term and the period leading up to it
- Respondents to the questionnaires frequently requested more to touch and do.
- Huge popularity with visitors and also the Warding Staff, whose job is made more enjoyable and rewarding when the visitors are pleased with the displays
- 30 years of Education in the Tower was a significant milestone

**The Interactives**

There are many learning styles so the intention was to create a variety of types of interaction

a) **'High-tech'**

Touch screens which enable the children to find out about gems in general and diamonds in particular. Four problem solving activities cover diamond cuts, how diamonds are formed, how diamonds are mined and diamond facets. Video clips also give background information.

1. Spot the difference
2. Diamond sorting
3. Diamond quiz

All provide a simple, fun game, but are thought provoking and informative.
The importance of real diamonds, with magnifiers to show them in greater detail, is more readily understood when their history is explained.

b) **'Low-tech'**

1. Touching replica inscriptions and trying a Brass Rubbings, or sketching a prisoner's carving. The label then encourages the family to visit the towers where the originals can be seen.
2. Building a 'Norman' Arch was designed to be a group activity – it cannot be done by one person. Made from foam to be safe, inexpensive so it will last for the duration of the exhibit but pieces be easily replaced.
3. Rubbing brasses of animals on a special souvenir worksheet shows animals which were actually in the Tower – one which wasn't.
4. Arming Henry VIII – a life sized magnetic armour which allows Henry to be armed in the correct order.
5. Hands on Armour 3 replica pieces – something for the adults too. Good quality replicas; a sword, a mail sleeve and a breastplate allow the most frequently asked question, how heavy is it, to be answered.
6. Seaside fun – Little and Large. Put your face behind the child's or adult's size armour for a souvenir photograph
7. Guessing games The Tower housed the Royal menagerie for many centuries, and some of the animals kept have an amazing tale to tell. A light-hearted look at some of the more quirky stories encourages the children to work from clues.

**Engaging with the visitor**

The education department as a major participant in the exhibition team was keen to"

- Reinforce learning by activity
- Use a mix of learning styles
- Use of low-tech and high-tech activity
- Demonstrate elements of their cross curricular sessions

**Audience Development**

Family-based activities provide added value for family groups visiting a heritage site which caters for a large tourist market. The need to find ways to engage the family audience which visits during the school holidays, but while still recognizing that the bulk of the visitors are foreign tourists, is a difficult one to

address. If something is being enjoyed by home family groups however, then a good atmosphere is created. A display which offers more children an active museum experience by providing engaging activity which is integrated does not detract but adds to the enjoyment.
The visitor experience can be enhanced and improved for all by offering activities specifically to engage the children in family groups, to hook their parents and by giving a good experience make the whole day better. We hope that by tarrying over the exhibition it will increase their enjoyment of the whole day. The general public too can be interested in what goes on in museums and by explaining a core function, which is usually offered to schools, they are introduced to a behind the scenes view.

**Collaborative Project**

The exhibition was created by the museum's own in-house design and display teams, along with the curator was has worked very closely with the Education Department in recent years. This close collaboration has produced an integrated result, and enables departments across the museum to apply the knowledge gained to developments elsewhere in the organisation.

**Planning for the future**
The exhibition will provide a way of moving forward and introduce into the permanent galleries low-tech and high-tech interactives which inform, explain, animate and contextualise the collection. This temporary exhibition will be the jumping off point for interactives in the permanent galleries in Leeds and in the new Armouries gallery in the Frazier Arms Museum in Louisville, Kentucky. The key words, relevant, safe, informative and fun have been at the forefront in all our planning.

**Sample of visitor comments**

It was gratifying to see that many children had taken the trouble to comment, and while single words like "cool" and "fantastic" predominated, there were remarkably few mild swear words and cheeky comments.

"Well done to the friendly volunteers"

"Extremely interesting, informative and fun"

"Brilliant idea, coolly recreated"

"Brilliant, I think the computers are excellent"

"Very good, kids need somewhere to have fun while learning"

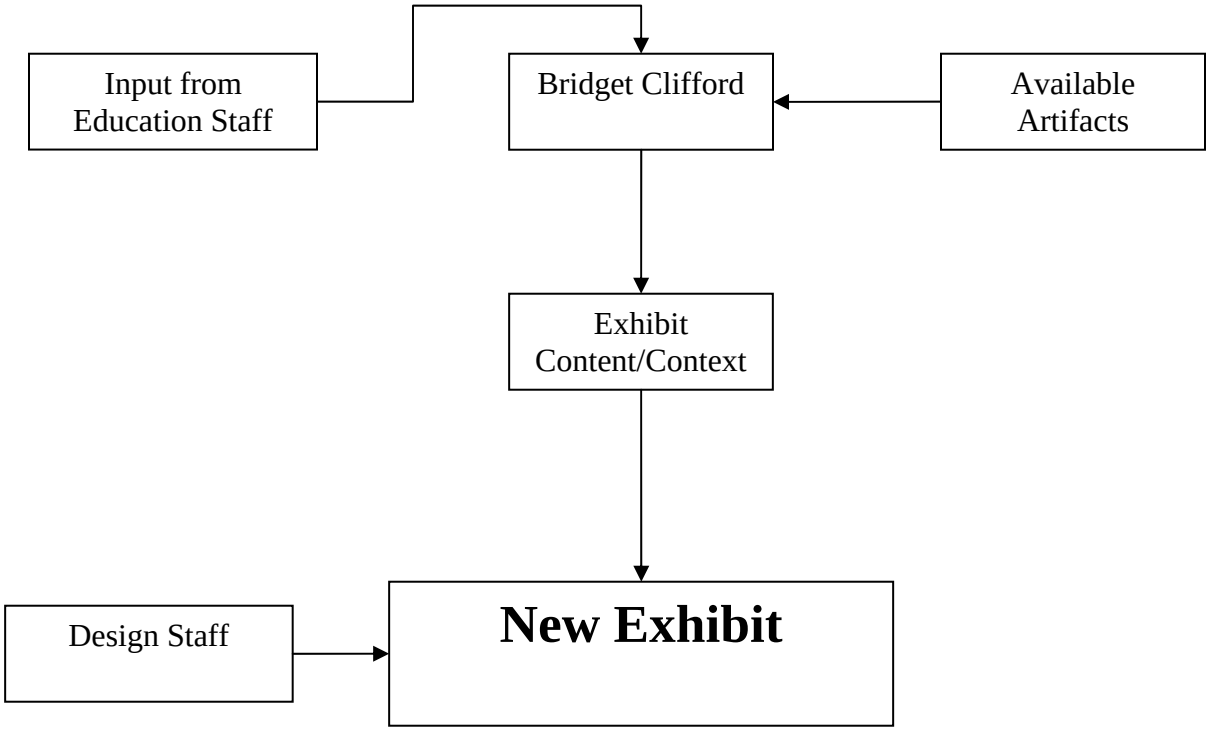
"Brass-rubbings took me back to my childhood – fantastic"

"The interactive games were superb and fantastic"

**Enclosures**

- Photographs of children and adults visiting the exhibition.
- Sample of souvenir worksheet
- Example of a worksheet completed by a child
- 2 Worksheets available to all visitors from the White Tower Information Desk
- 2 Schools' worksheets
- Press Release
- Formal Education Programme 2004-05
- Copies of 4 graphic panels

**Organization Flow Chart**




The above organization chart shows the process for decision making in new exhibit design.

# Appendix B: Survey I (Open-ended)

**Please be honest in your answers as this information will be used to develop future exhibits at HM Tower of London. Your responses and opinions will contribute to the betterment of the facility.**

Please circle your gender and age group, and write in your Nationality:

**Gender:** ***Male Female***

**Age:** ***12 and Under 13-17 18-30 31-65 65+***

**Nationality: _____**

1.) What type of group did you visit "Hands on History" with?
- Individual
- Family
- Friends
- School Group
- Other _____

2.) Do you enjoy history?
- Yes
- No
- Neutral to the subject

3.) How *educational* did you find the "Hands on History" exhibit?
- Very
- A little
- Not much
- Not at all

4.) How *interesting* did you find the "Hands on History" exhibit?
- Very
- A little
- Not much
- Not at all

5.) How did the "Hands on History" exhibit compare to other exhibits at HM Tower of London?
- Much better
- A little better
- Same
- A little worse
- Much worse

6.) What was the most *educational* part of the exhibit?

7.) What was the most *interesting* part of the exhibit?

8.) What part(s) of the "Hands on History" exhibit did you *not* like?

Thank you very much for your time. Your input is greatly appreciated. Enjoy the rest of your time visiting HM Tower of London

# Appendix C: Survey II (Non-open-ended)

**Please be honest in your answers as this information will be used to develop future exhibits at HM Tower of London. Your responses and opinions will contribute to the betterment of the facility.**

Please circle your gender and age group, and write in your Nationality:

**Gender:** ***Male Female***

**Age:** ***12 and Under 13-17 18-30 31-65 65+***

**Nationality: _____**

1.) What type of group did you visit "Hands on History" with?
- Individual
- Family
- Friends
- School Group
- Other _____

2.) Do you enjoy history?
- Yes
- No
- Neutral to the subject

3.) How *educational* did you find the "Hands on History" exhibit?
- Very
- A little
- Not much
- Not at all

4) How *interesting* did you find the "Hands on History" exhibit?
- Very
- A little
- Not much
- Not at all

5) How did the "Hands on History" exhibit compare to other exhibits that you have seen at HM Tower of London?
- Much better
- A little better
- Same
- A little worse
- Much worse

6) Did you feel crowded in the "Hands on History" exhibit?
- Yes
- No

7) Prior to your visit, were you aware that HM Tower of London had an interactive, hands-on exhibit?
- Yes
- No

8) Did you read the instruction labels for the interactive sections of the exhibit?
- Yes
- No

Additional Comments: _____

Thank you very much for your time. Your input is greatly appreciated. Enjoy the rest of your time visiting HM Tower of London.

# Appendix D: Survey III (Label Survey)

Exhibit: _____

**Individual Exhibits**

Age: _____ Nationality: _____

1. Do you feel that the labels were well placed?

    a. Yes
    b. No

2. Did you read the labels?

    a. Yes
    b. No

3. Is there an acceptable amount of text on the labels?

    a. Yes
    b. No

4. Were they of an appropriate reading level?

    a. Yes
    b. No

5. Did you have trouble with the size/colour of the text/background?

    a. Yes
    b. No

# Appendix E: Ant Trailing Sheet

| ES | Children in Armour | AD 40 | Rub 1 | Norm Helm | Norm .Arch | AD 1300 | Rub 2 | Diam 1 | Diam 2 | Diam Inter. | Mag Henry | SMA | Inscr. & Nail | Helmet and BP | Large and Small Armour | Rep. Jewels | AD 2000 | Tower Power | Menag. | Yeoman Warder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | |
| Re | | | | | | | | | | | | | | | | | | | | |
| In | | | | | | | | | | | | | | | | | | | | |

# Appendix F: Comment Book Responses

Figure F - 1 and Figure F - 2 below show visitor response to the "Hands on History" exhibit. Figure F - 1 is a representation of all visitors that chose to make use of the comment book, while Figure F - 2 shows only those visitors that are native English speakers (i.e. are Australian, British, Canadian, Irish or American). While these results seem to indicate an overwhelmingly positive response, the sample population is somewhat self-selecting and therefore may not accurately reflect the opinions of all visitors to the museum. However, the sheer amount of positive feedback generated by the exhibit makes it impossible to ignore these findings. It was also interesting to note that English speakers seem to have more positive feelings toward the exhibit, while foreigners (although still overwhelmingly positive) have a greater percentage of negative responses. This was mostly likely due to the cultural and language barriers between the visitors and the subject matter and could possibly be remedied with label translations.

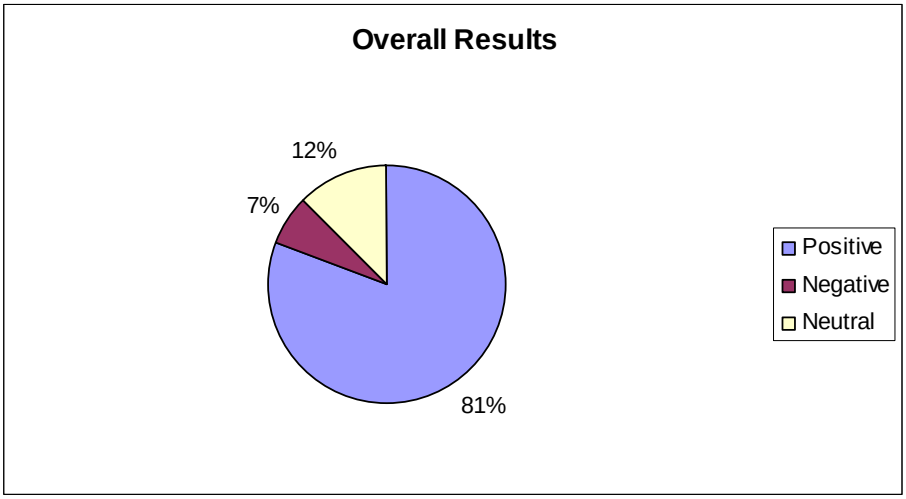



**Figure F - 1: Overall Comment Book Results**

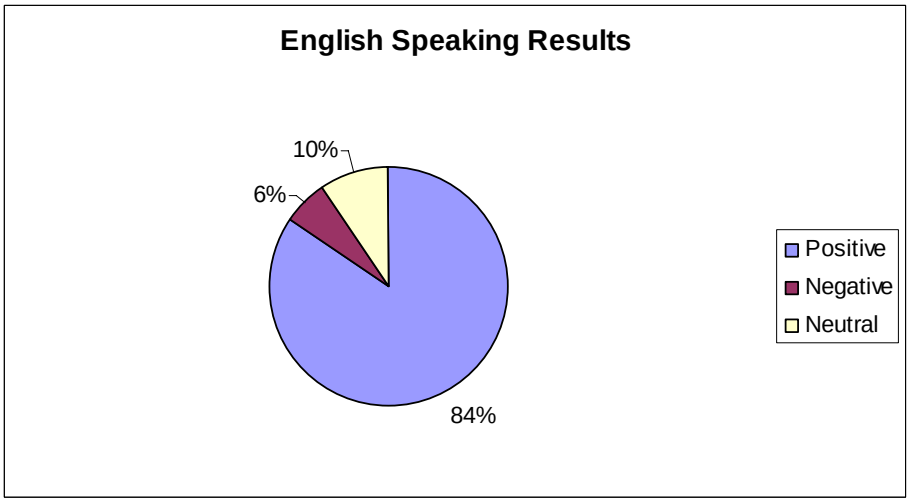



**Figure F - 2: English Speaking Comment Book Results**

# Appendix G: Ant Trail Analysis of Non-Interactive Sub-exhibits

Below are the analysis charts for the average time spent (or "holding power") at the non-interactive sub-exhibits in "Hands on History." A complete analysis, general trends, and possible reasons for the data collected can be viewed in 5.5.1., Non-Interactive Sub-exhibits.

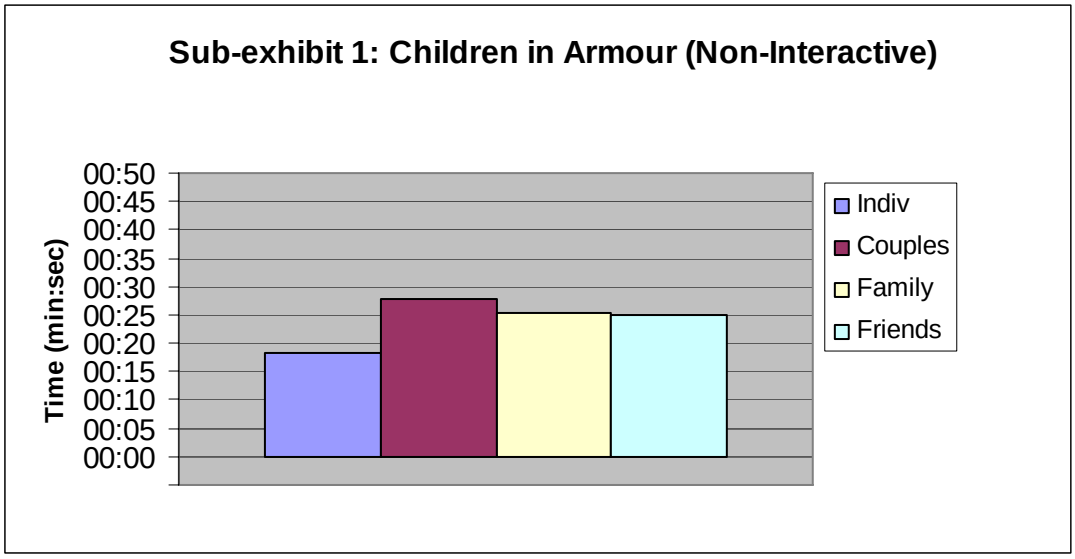



**Figure G - 1: Sub-exhibit 1 time spent**

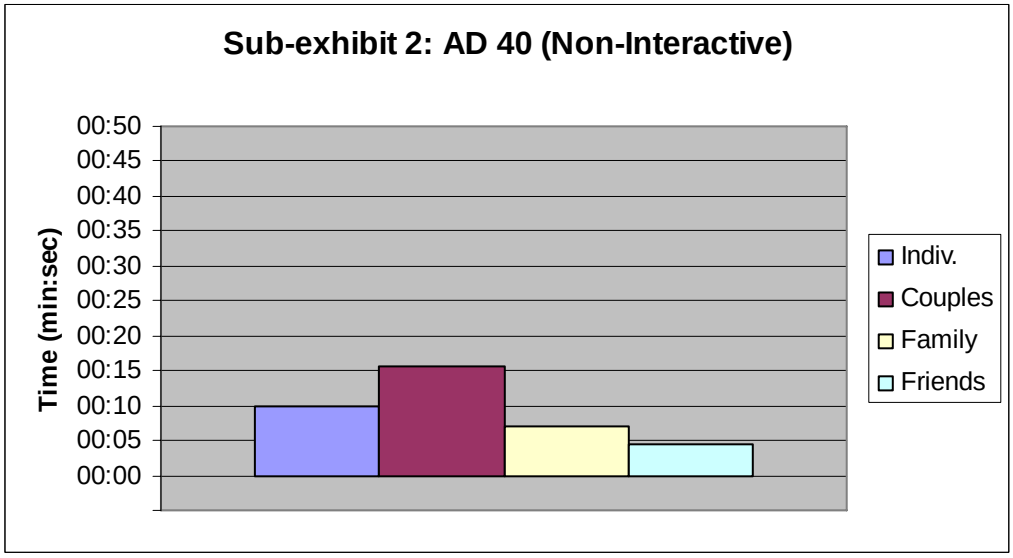



**Figure G - 2: Sub-exhibit 2 time spent**

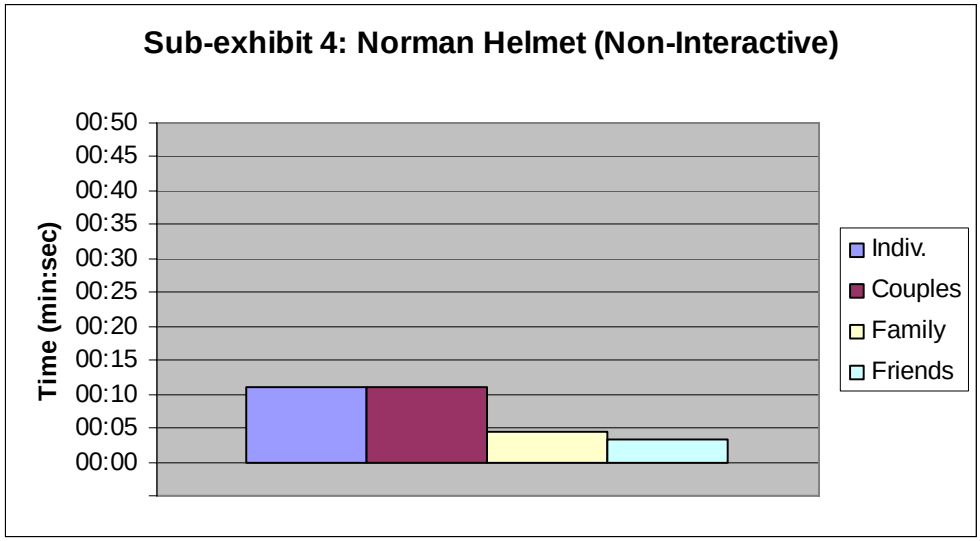



**Figure G - 3: Sub-exhibit 4 time spent**

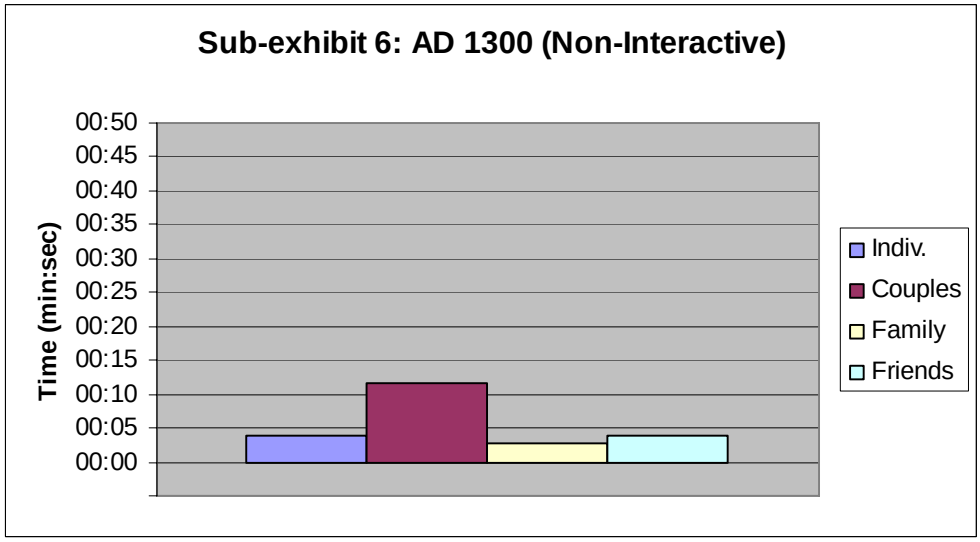



**Figure G - 4: Sub-exhibit 6 time spent**

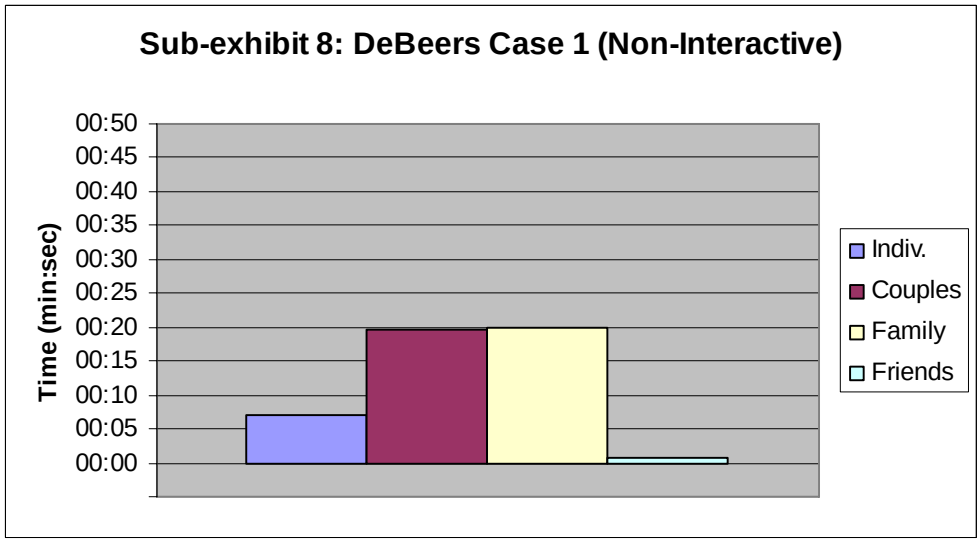



**Figure G - 5: Sub-exhibit 8 time spent**

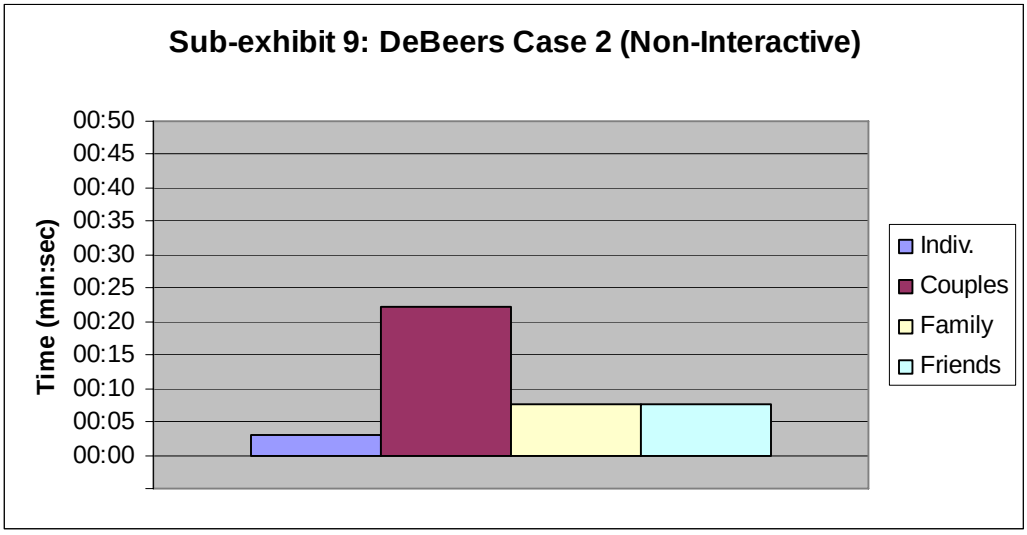



**Figure G - 6: Sub-exhibit 9 time spent**

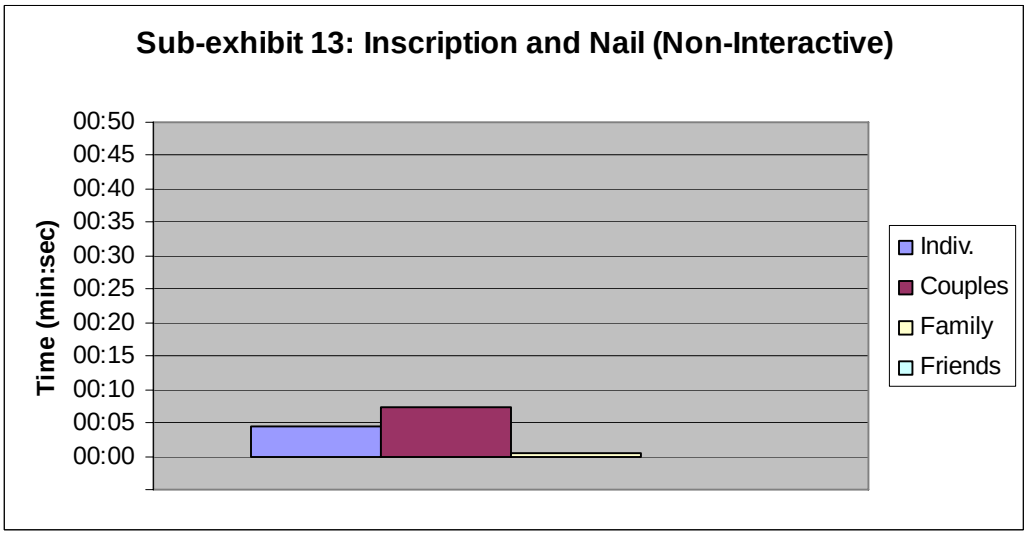



**Figure G - 7: Sub-exhibit 13 time spent**

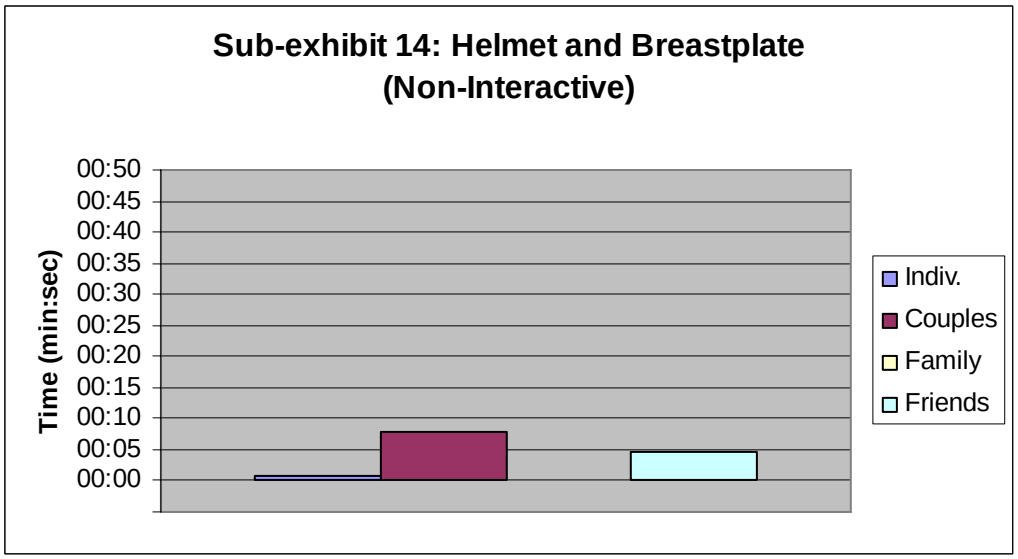



**Figure G - 8: Sub-exhibit 14 time spent**

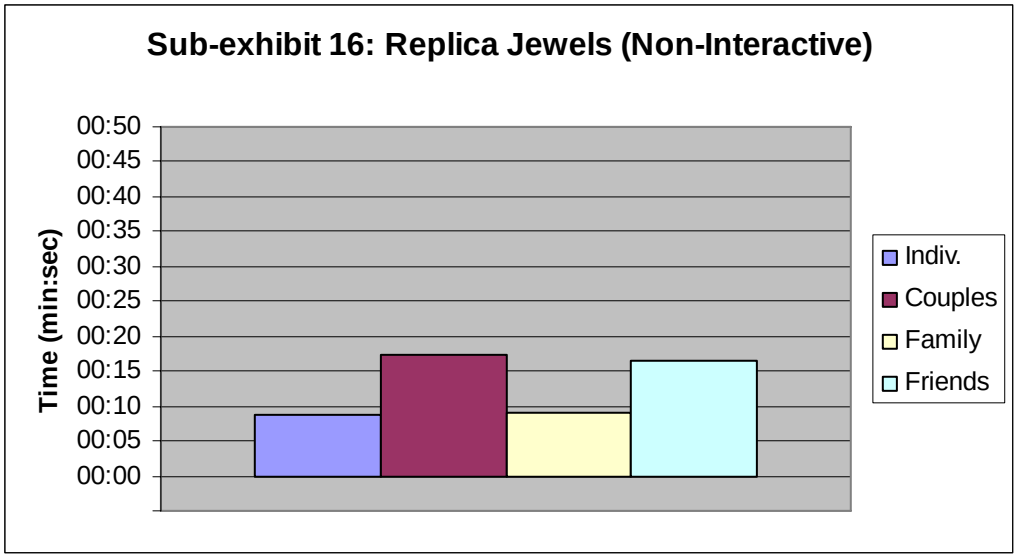



**Figure G - 9: Sub-exhibit 16 time spent**

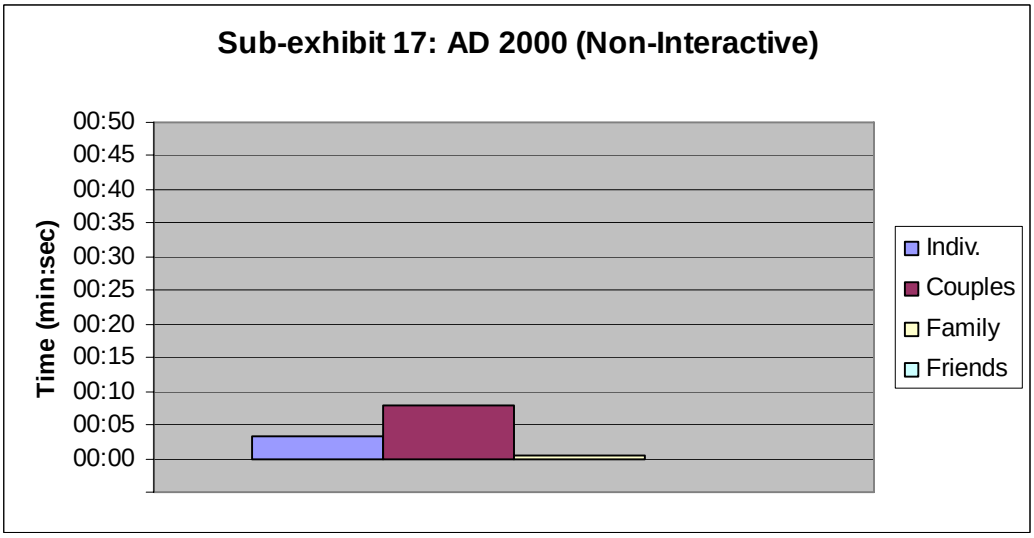



**Figure G - 10: Sub-exhibit 17 time spent**

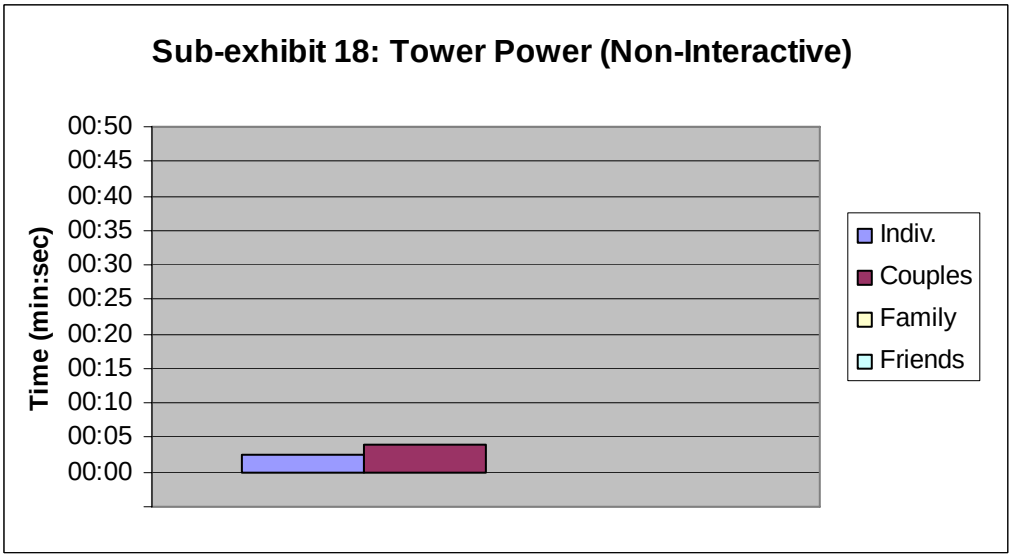



**Figure G - 11: Sub-exhibit 18 time spent**

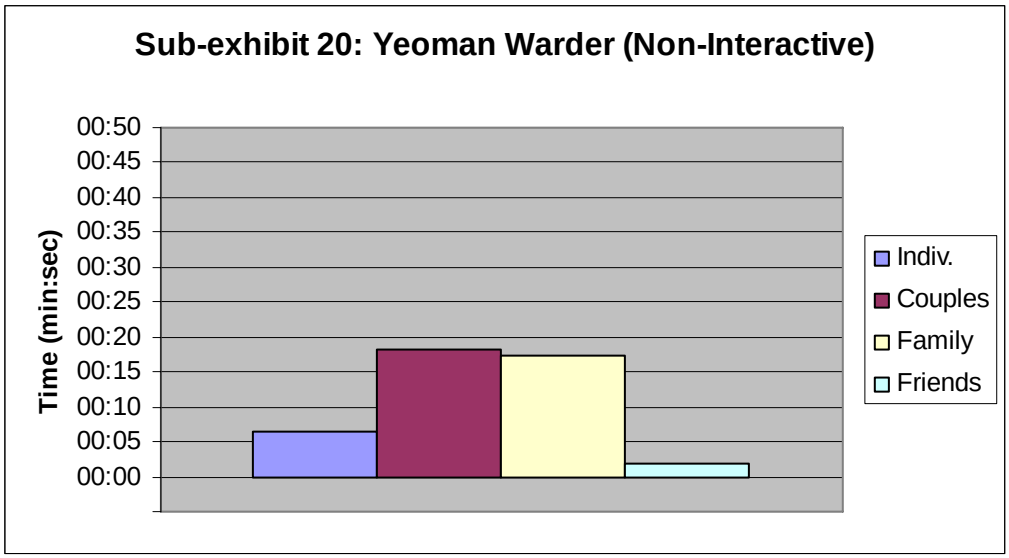



**Figure G - 12: Sub-exhibit 20 time spent**

# Appendix H: Ant Trail Analysis of Interactive Sub-exhibits

Below are the analysis charts for the average time spent at the interactive sub-exhibits in "Hands on History." A complete analysis with general trends for the data collected can be viewed in 5.5.2 Interactive Sub-exhibits.

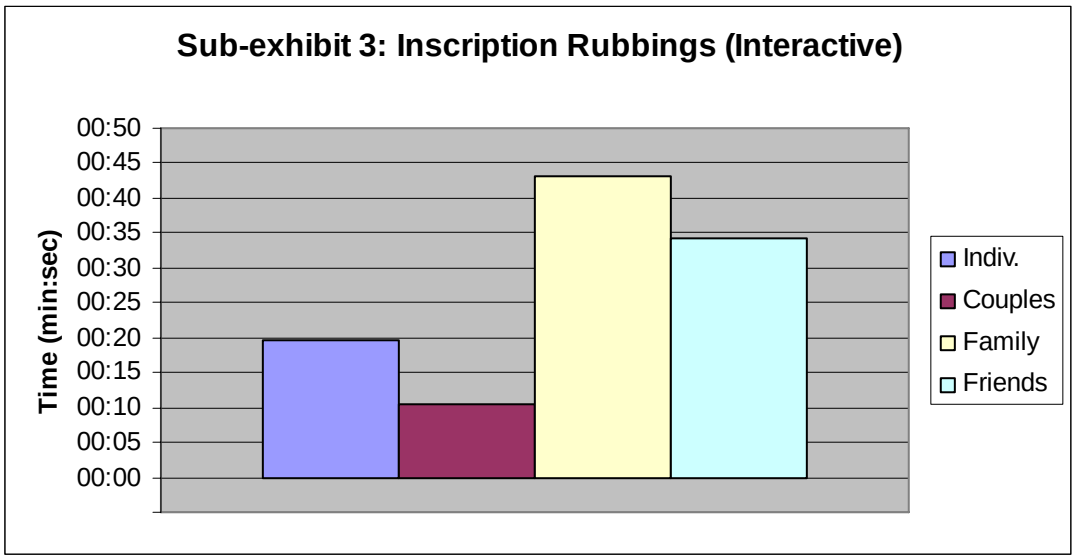



**Figure H - 1: Sub-exhibit 3 time spent**

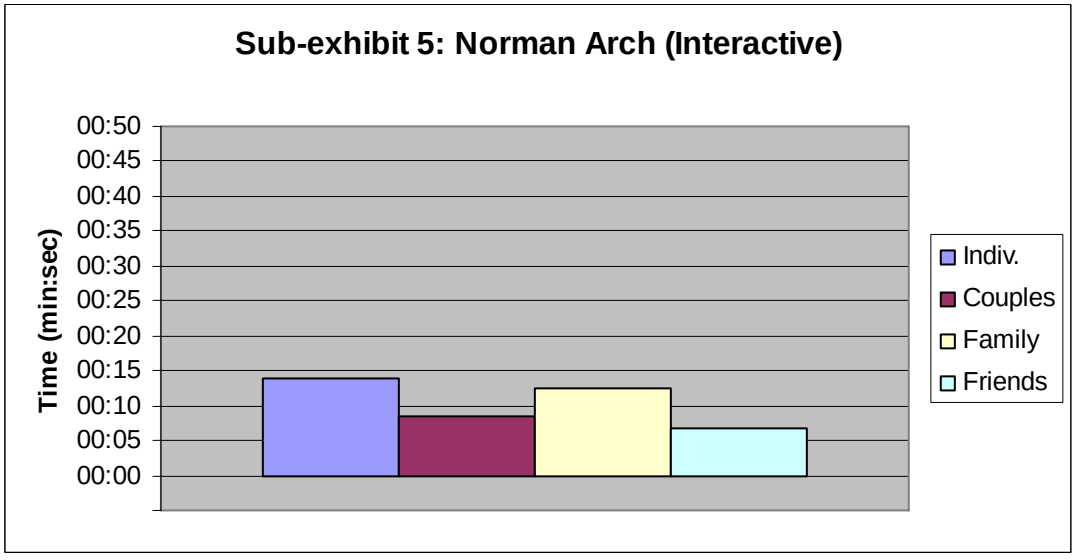



**Figure H - 2: Sub-exhibit 5 time spent**

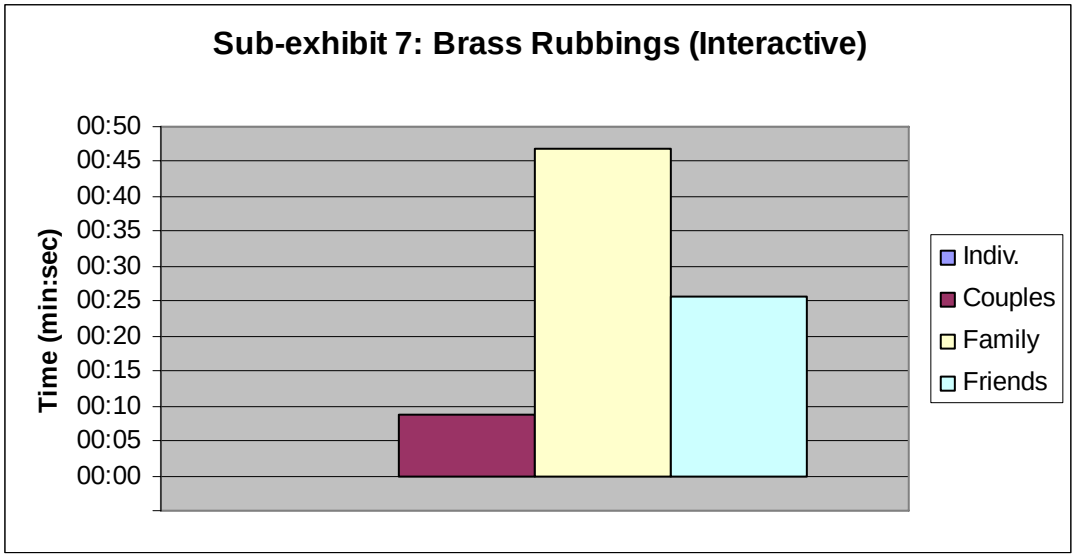



**Figure H - 3: Sub-exhibit 7 time spent**

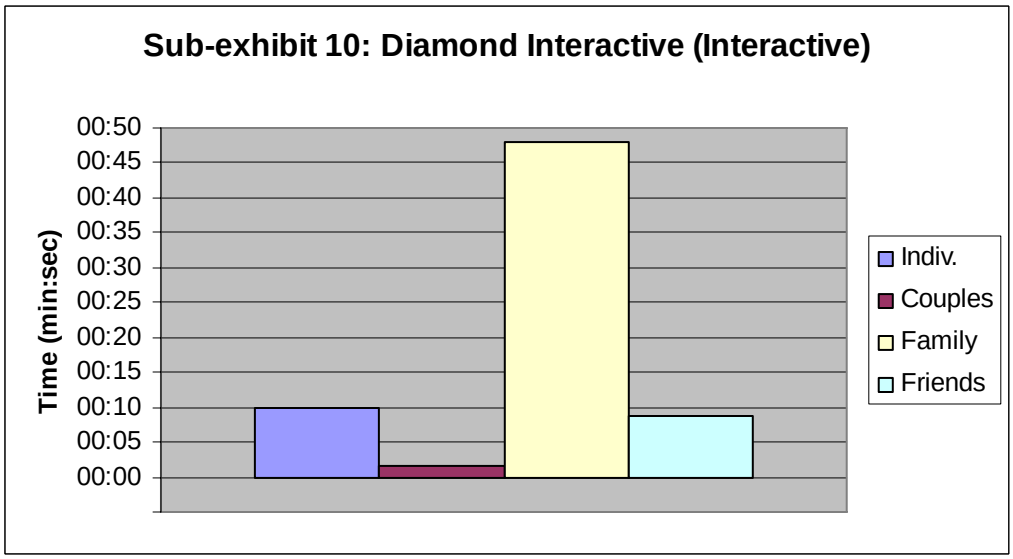



**Figure H - 4: Sub-exhibit 10 time spent**

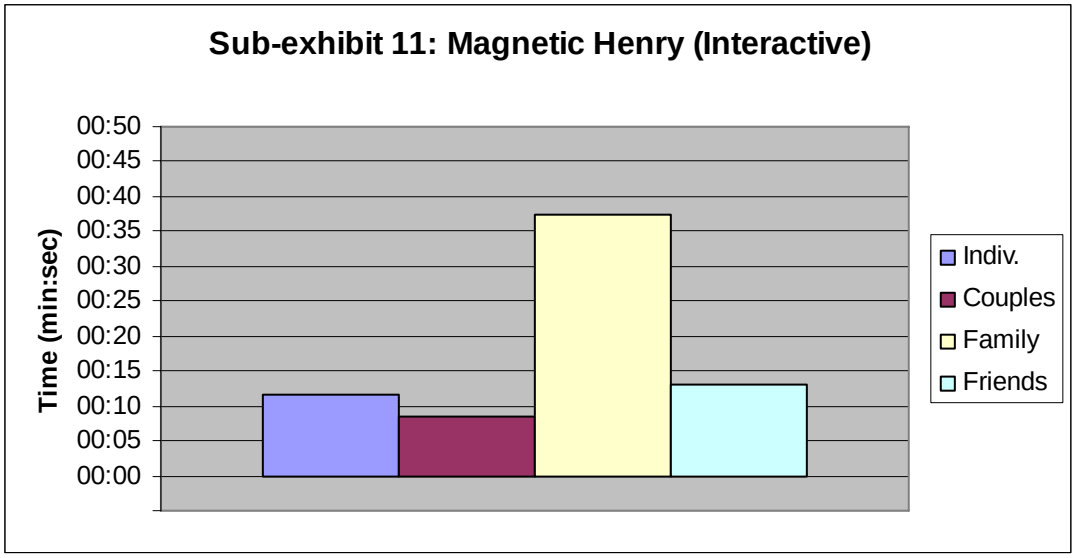



**Figure H - 5: Sub-exhibit 11 time spent**

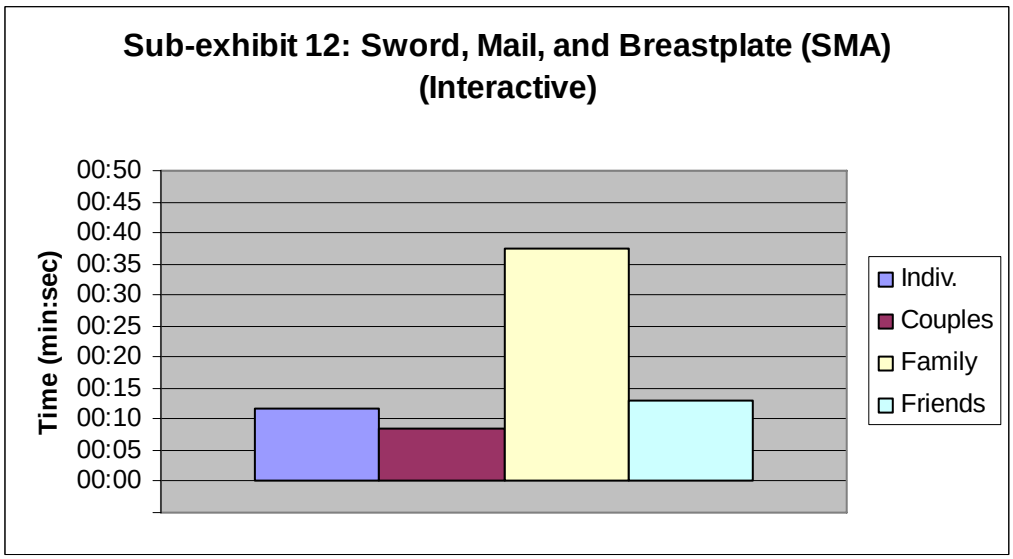



**Figure H - 6: Sub-exhibit 12 time spent**

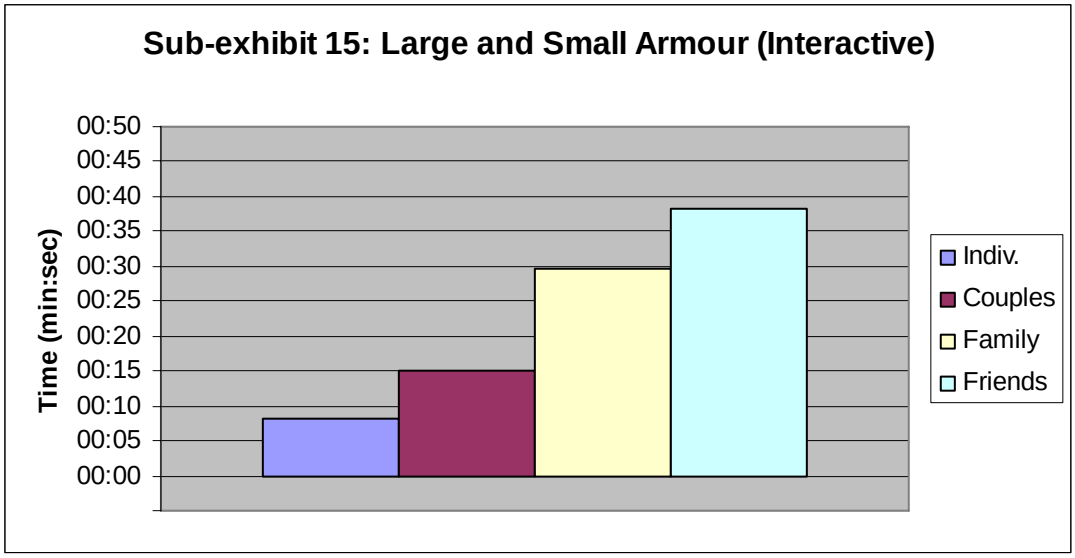



**Figure H - 7: Sub-exhibit 15 time spent**

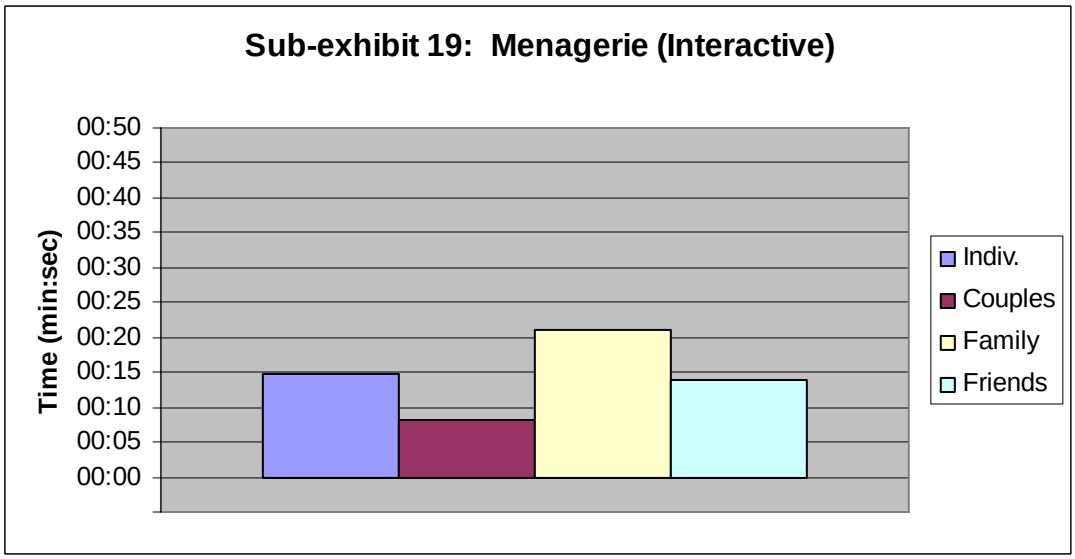



**Figure H - 8: Sub-exhibit 19 time spent**

# Appendix I: Percent of People that visited sub-exhibits

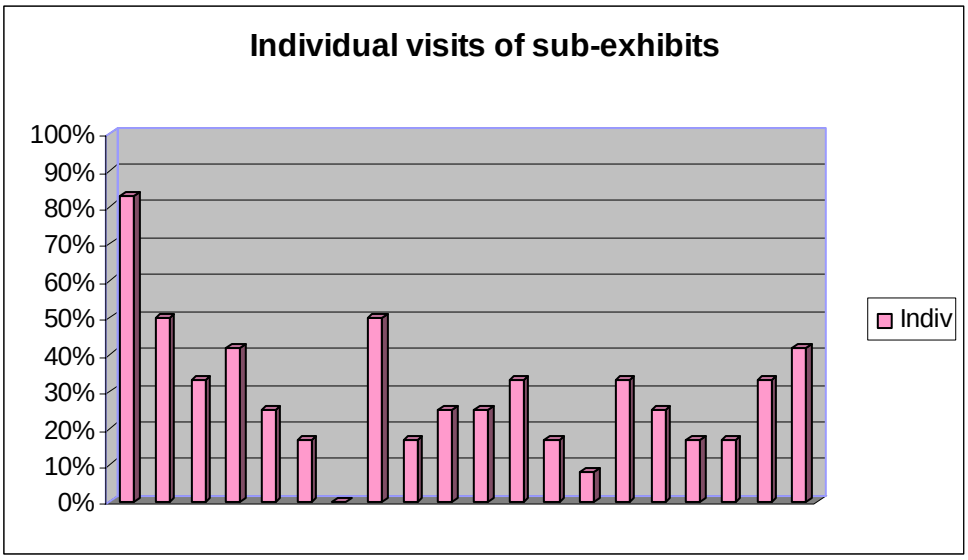



**Figure I - 1: Individual Visits of all exhibits**

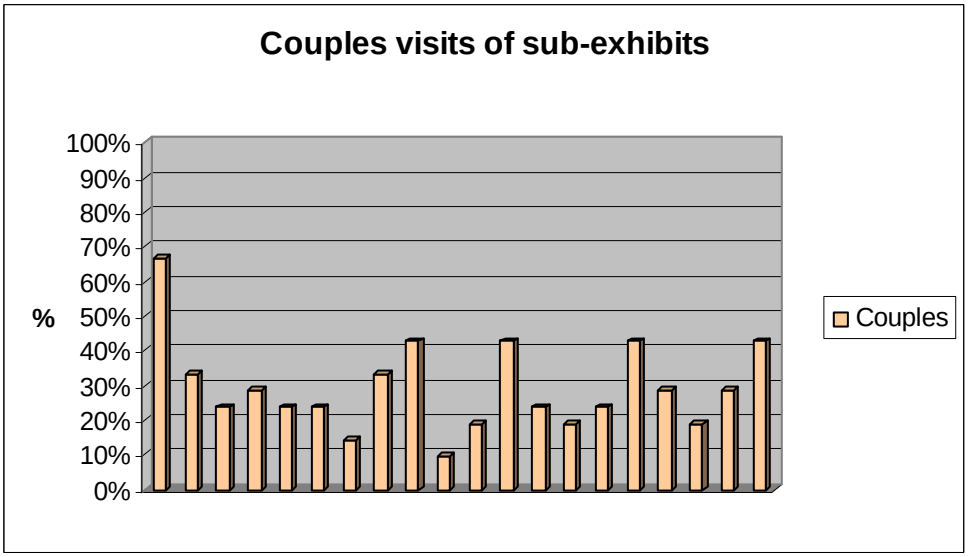



**Figure I - 2: Couple Visits of all exhibits**

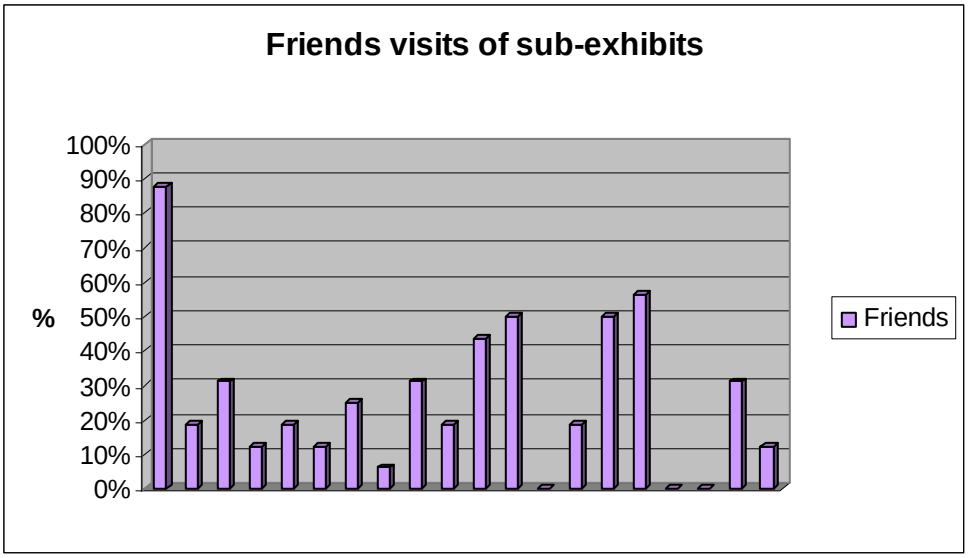



**Figure I - 3: Friends Visits of all exhibits**

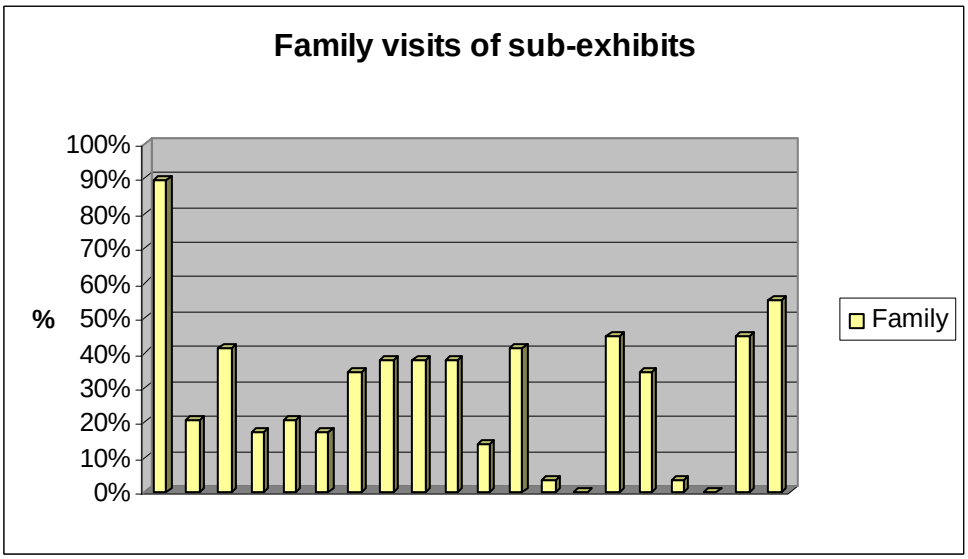



**Figure I - 4: Family Visits of all exhibits**

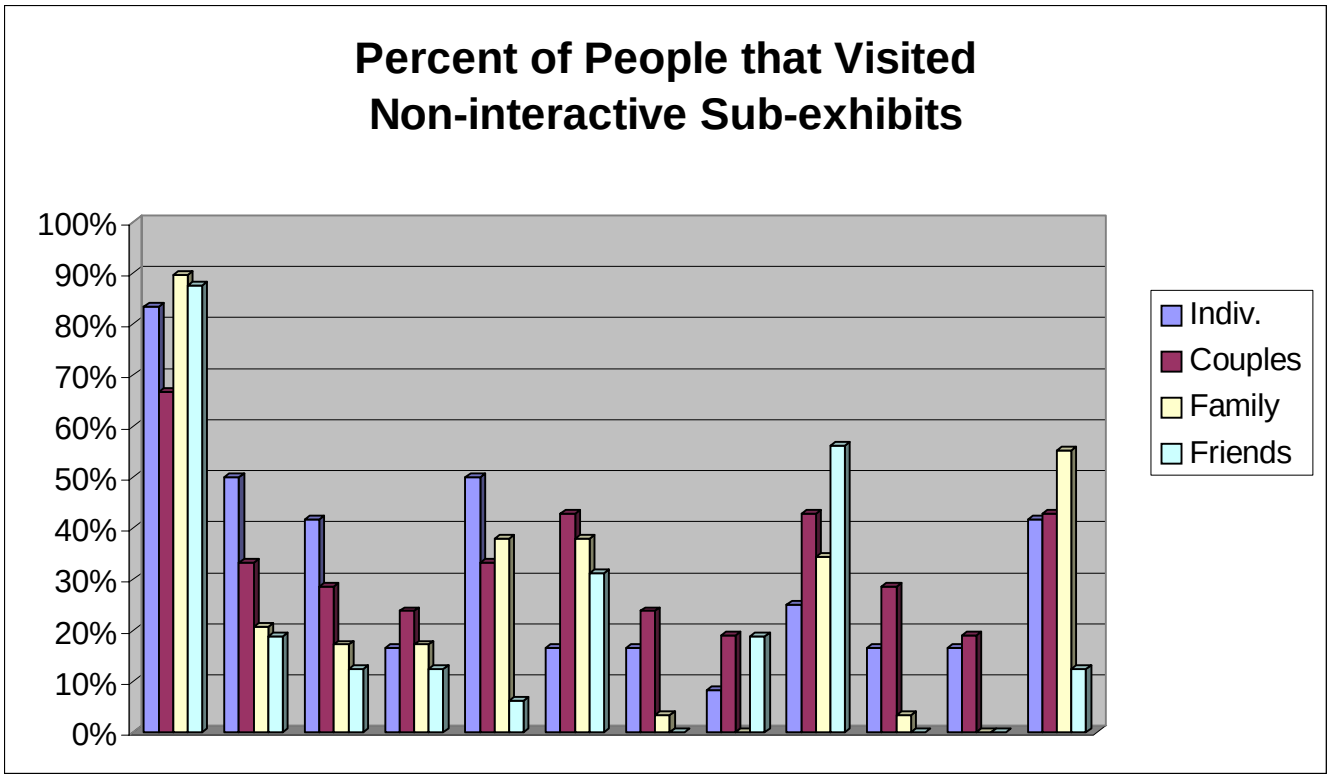



**Figure I - 5: Percentage visits of non-interactives**

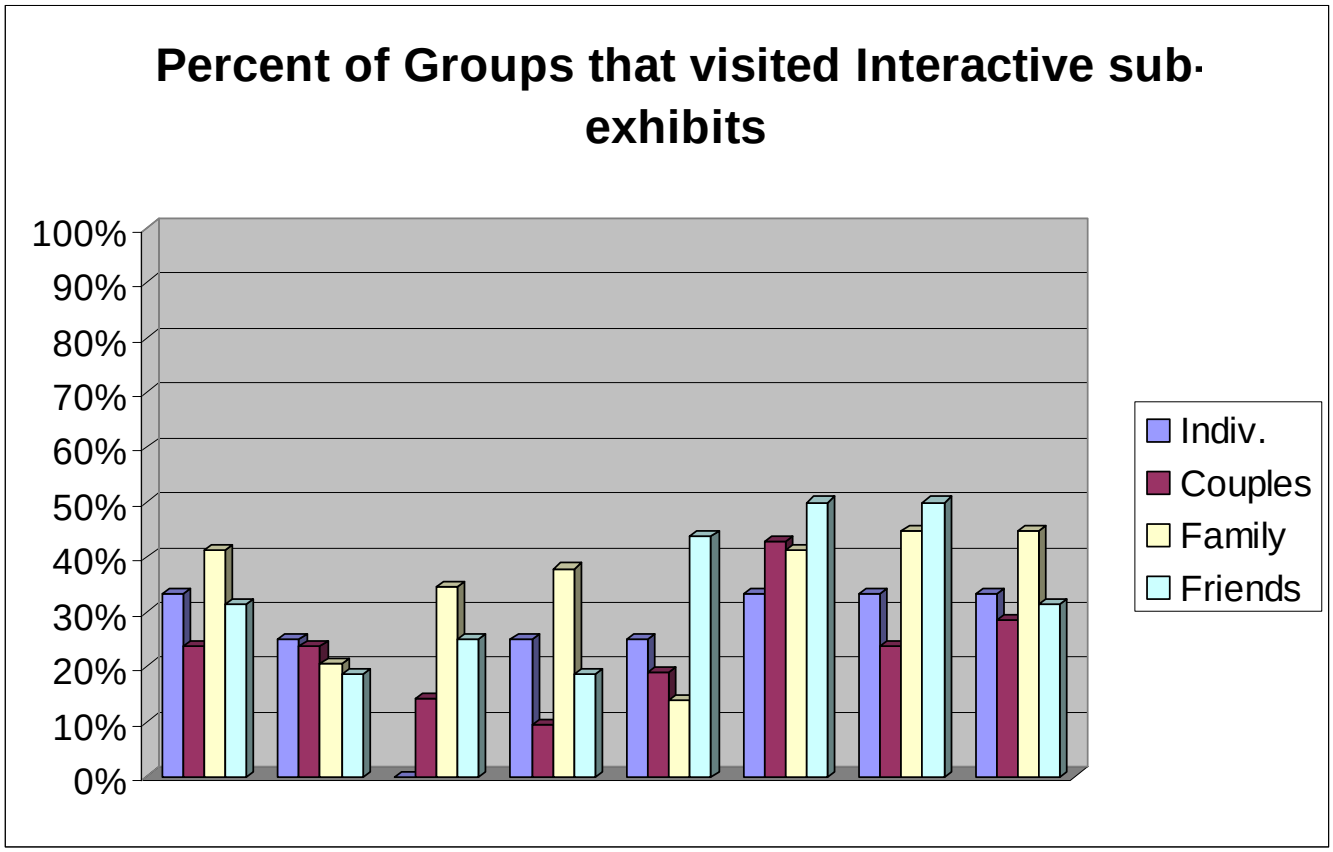



**Figure I - 6: Percentage visits of interactives**

# Appendix J: Visitor Numbers

As has already been mentioned in this report, most times when surveys were being handed out or ant trailing was taking place visitor numbers were also being tallied. During the course of our data gathering over 8500 people were counted passing through the exhibit, of which roughly 55% were female and 45% male. Based on the amount of time that passed during these intervals it was calculated that an average of about 700 people per hour passed through the exhibit. Table J - 1 shown below contain the numbers of visitors that were counted during times that we were also gathering data.

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| | | | | |
| 16-Mar | 3:30-3:45 | | | 119 |
| | 3:45-4:00 | | | 176 |
| | 4:00-4:15 | | | 136 |
| | 4:15-4:30 | | | 130 |
| | Total | | | 561 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 17-Mar | 3:30-3:45 | | | 123 |
| | 3:45-4:00 | | | 91 |
| | 4:00-4:15 | | | 45 |
| | 4:15-4:30 | | | 84 |
| | 4:30-4:45 | | | 115 |
| | Total | | | 458 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 19-Mar | 1:15-1:30 | | | 149 |
| | 1:30-1:45 | | | 151 |
| | 1:45-2:00 | | | 112 |
| | 2:00-2:15 | | | 109 |
| | Total | | | 521 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 21-Mar | 11:20-11:35 | | | 139 |
| | 11:35-11:50 | | | 247 |
| | 11:50-12:05 | | | 261 |
| | 12:05-12:20 | | | 264 |
| | 12:20-12:35 | | | 230 |
| | 12:35-12:50 | | | 236 |
| | Total | | | 1377 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 23-Mar | 2:00-2:15 | | | 127 |
| | 2:15-2:30 | | | 130 |
| | 2:30-2:45 | | | 179 |
| | 2:45-3:00 | | | 218 |
| | 3:00-3:15 | | | 229 |
| | 3:15-3:30 | | | 181 |
| | 3:30-3:45 | | | 207 |
| | 3:45-4:00 | | | 178 |
| | Total | | | 1449 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 29-Mar | 11:15-11:30 | 80 | 100 | 180 |
| | 11:30-11:45 | 95 | 96 | 191 |
| | 11:45-12:00 | 98 | 138 | 236 |
| | 12:05-12:20 | 121 | 141 | 262 |
| | 12:20-12:35 | 104 | 137 | 241 |
| | 12:45-1:00 | 118 | 128 | 246 |
| | Total | 616 | 740 | 1356 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 30-Mar | 11:20-11:40 | 104 | 150 | 254 |
| | 11:40-12:00 | 130 | 149 | 279 |
| | 12:00-12:15 | 125 | 116 | 241 |
| | 12:15-12:30 | 77 | 80 | 157 |
| | 12:30-12:45 | 103 | 110 | 213 |
| | 12:45-1:00 | 99 | 135 | 234 |
| | Total | 638 | 740 | 1378 |

| Date | Time | Men | Women | Total |
|---|---|---|---|---|
| 31-Mar | 10:15-10:30 | 53 | 60 | 113 |
| | 10:30-10:45 | 55 | 35 | 90 |
| | 10:45-11:00 | 40 | 91 | 131 |
| | 11:00-11:20 | 135 | 162 | 297 |
| | 11:20-11:40 | 108 | 129 | 237 |
| | 11:40-12:00 | 124 | 166 | 290 |
| | 12:20-12:40 | 138 | 152 | 290 |
| | Total | 653 | 795 | 1448 |

**Table J - 1: Visitor Tallies**

| Date | Time | Total |
|---|---|---|
| 15-Apr | 10:00-10:30 | 104 |
| Friday | 10:30-11:00 | 207 |
| (Full Day) | 11:00-11:30 | 348 |
| | 11:30-12:00 | 351 |
| | 12:00-12:30 | 338 |
| | 12:30-1:00 | 243 |
| | 1:00-1:30 | 390 |
| | 1:30-2:00 | 270 |
| | 2:00-2:30 | 277 |
| | 2:30-3:00 | 274 |
| | 3:00-3:30 | 278 |
| | 3:30-4:00 | 422 |
| | Total | 3502 |

**Table J - 2: Full Day Count**

# Appendix K: Common Response in Surveys

| *Most Common Responses* | *Educational* | *Interesting* |
|---|---|---|
| DeBeers Cases 1 and 2 | 16% | 24% |
| Sword, Mail, Armour | 22% | 20% |
| Magnetic Henry | 17% | 13% |
| Spine Timeline | 17% | 8% |
| Norman Arch | 14% | 5% |
| Yeoman Warder | 5% | 6% |
| Replica Jewels | 3% | 6% |
| Large and Small Armour | 2% | 3% |
| Diamond Interactive | 2% | 4% |
| Menagerie | 2% | 0% |
| Brass Rubbings | 0% | 10% |
| Painting | 0% | 1% |
| **Total Votes** | 63 | 79 |
| **Sum of Percentage (check)** | 100% | 100% |

**Table K - 1: Most Common Responses**

# Appendix L: Percent Visited vs. Holding Power of Sub-exhibits

This appendix compares and distinguishes relationships between sub-exhibits' ability to draw visitor attention and the average time they spend at the respective exhibits.

| *Overall* | | | | |
|---|---|---|---|---|
| | | | | |
| *Exhibits* | **% Visited** | | *Exhibits* | **Holding Power (min:sec)** |
| | | | | |
| **Children in Armour** | 82% | | **Inscription Rubbings** | 00:29 |
| **SMA** | 42% | | **Children in Armour** | 00:25 |
| **Replica Jewels** | 41% | | **Brass Rubbings** | 00:25 |
| **Yeoman Warder** | 40% | | **Large and Small Armour** | 00:25 |
| **Large and Small Armour** | 40% | | **Diamond Interactive** | 00:22 |
| **Menagerie** | 36% | | **Magnetic Henry** | 00:19 |
| **DeBeers Case 2** | 36% | | **SMA** | 00:19 |
| **Inscription Rubbings** | 35% | | **Menagerie** | 00:15 |
| **DeBeers Case 1** | 33% | | **DeBeers Case 1** | 00:14 |
| **AD 40** | 26% | | **Replica Jewels** | 00:13 |
| **Diamond Interactive** | 24% | | **Yeoman Warder** | 00:13 |
| **Magnetic Henry** | 23% | | **DeBeers Case 2** | 00:12 |
| **Brass Rubbings** | 22% | | **Arch** | 00:10 |
| **Arch** | 22% | | **AD 40** | 00:08 |
| **Norman Helmet** | 21% | | **Norman Helmet** | 00:06 |
| **AD 1300** | 18% | | **AD 1300** | 00:06 |
| **AD 2000** | 10% | | **Helmet and Breastplate** | 00:03 |
| **Inscription and Nail** | 9% | | **AD 2000** | 00:03 |
| **Helmet and Breastplate** | 9% | | **Inscription and Nail** | 00:02 |
| **Tower Power** | 6% | | **Tower Power** | 00:01 |
| | | | | |
| | **Interactive sub-exhibits** | | | |
| | | | | |
| | **Non-Interactive Sub-exhibits** | | | |

**Table L - 1: Overall Attractiveness vs. Holding Power**

| *Individuals* | | | | |
|---|---|---|---|---|
| | | | | |
| *Exhibits* | **% Visited** | | *Exhibits* | **Holding Power (min:sec)** |
| | | | | |
| **Children in Armour** | 83% | | **Inscription Rubbings** | 00:20 |
| **DeBeers Case 1** | 50% | | **Children in Armour** | 00:18 |
| **AD 40** | 50% | | **Menagerie** | 00:15 |
| **Yeoman Warder** | 42% | | **Arch** | 00:14 |
| **Norman Helmet** | 42% | | **SMA** | 00:12 |
| **SMA** | 33% | | **Norman Helmet** | 00:11 |
| **Large and Small Armour** | 33% | | **AD 40** | 00:10 |
| **Menagerie** | 33% | | **Diamond Interactive** | 00:10 |
| **Inscription Rubbings** | 33% | | **Replica Jewels** | 00:09 |
| **Replica Jewels** | 25% | | **Large and Small Armour** | 00:08 |
| **Diamond Interactive** | 25% | | **DeBeers Case 1** | 00:07 |
| **Magnetic Henry** | 25% | | **Yeoman Warder** | 00:06 |
| **Arch** | 25% | | **Inscription and Nail** | 00:05 |
| **DeBeers Case 2** | 17% | | **AD 1300** | 00:04 |
| **AD 1300** | 17% | | **AD 2000** | 00:03 |
| **AD 2000** | 17% | | **DeBeers Case 2** | 00:03 |
| **Inscription and Nail** | 17% | | **Magnetic Henry** | 00:03 |
| **Tower Power** | 17% | | **Tower Power** | 00:02 |
| **Helmet and Breastplate** | 8% | | **Helmet and Breastplate** | 00:01 |
| **Brass Rubbings** | 0% | | **Brass Rubbings** | 00:00 |
| | | | | |
| | **Interactive sub-exhibits** | | | |
| | | | | |
| | **Non-Interactive Sub-exhibits** | | | |

**Table L - 2: Individual Attractiveness vs. Holding Power**

| *Couples* | | | | |
|---|---|---|---|---|
| | | | | |
| *Exhibits* | **% Visited** | | *Exhibits* | **Holding Power (min:sec)** |
| | | | | |
| **Children in Armour** | 67% | | **Children in Armour** | 00:28 |
| **Yeoman Warder** | 43% | | **DeBeers Case 2** | 00:22 |
| **SMA** | 43% | | **SMA** | 00:21 |
| **Replica Jewels** | 43% | | **Inscription Rubbings** | 00:20 |
| **DeBeers Case 2** | 43% | | **DeBeers Case 1** | 00:20 |
| **DeBeers Case 1** | 33% | | **Yeoman Warder** | 00:18 |
| **AD 40** | 33% | | **Replica Jewels** | 00:17 |
| **Norman Helmet** | 29% | | **AD 40** | 00:16 |
| **Menagerie** | 29% | | **Large and Small Armour** | 00:15 |
| **AD 2000** | 29% | | **AD 1300** | 00:12 |
| **Large and Small Armour** | 24% | | **Norman Helmet** | 00:11 |
| **Inscription Rubbings** | 24% | | **Brass Rubbings** | 00:09 |
| **Arch** | 24% | | **Magnetic Henry** | 00:08 |
| **AD 1300** | 24% | | **Helmet and Breastplate** | 00:08 |
| **Inscription and Nail** | 24% | | **Arch** | 00:08 |
| **Magnetic Henry** | 19% | | **Menagerie** | 00:08 |
| **Tower Power** | 19% | | **AD 2000** | 00:08 |
| **Helmet and Breastplate** | 19% | | **Inscription and Nail** | 00:07 |
| **Brass Rubbings** | 14% | | **Tower Power** | 00:04 |
| **Diamond Interactive** | 10% | | **Diamond Interactive** | 00:02 |
| | | | | |
| | **Interactive sub-exhibits** | | | |
| | | | | |
| | **Non-Interactive Sub-exhibits** | | | |

**Table L - 3: Couples Attractiveness vs. Holding Power**

| *Families* | | | | |
|---|---|---|---|---|
| | | | | |
| *Exhibits* | **% Visited** | | *Exhibits* | **Holding Power (min:sec)** |
| | | | | |
| **Children in Armour** | 90% | | **Diamond Interactive** | 00:48 |
| **Yeoman Warder** | 55% | | **Brass Rubbings** | 00:47 |
| **Menagerie** | 45% | | **Inscription Rubbings** | 00:43 |
| **Large and Small Armour** | 45% | | **Magnetic Henry** | 00:37 |
| **SMA** | 41% | | **Large and Small Armour** | 00:30 |
| **Inscription Rubbings** | 41% | | **Children in Armour** | 00:25 |
| **DeBeers Case 2** | 38% | | **SMA** | 00:22 |
| **DeBeers Case 1** | 38% | | **Menagerie** | 00:21 |
| **Diamond Interactive** | 38% | | **DeBeers Case 1** | 00:20 |
| **Replica Jewels** | 34% | | **Yeoman Warder** | 00:17 |
| **Brass Rubbings** | 34% | | **Arch** | 00:13 |
| **AD 40** | 21% | | **Replica Jewels** | 00:09 |
| **Arch** | 21% | | **DeBeers Case 2** | 00:08 |
| **Norman Helmet** | 17% | | **AD 40** | 00:07 |
| **AD 1300** | 17% | | **Norman Helmet** | 00:04 |
| **Magnetic Henry** | 14% | | **AD 1300** | 00:03 |
| **AD 2000** | 3% | | **Inscription and Nail** | 00:01 |
| **Inscription and Nail** | 3% | | **AD 2000** | 00:00 |
| **Tower Power** | 0% | | **Helmet and Breastplate** | 00:00 |
| **Helmet and Breastplate** | 0% | | **Tower Power** | 00:00 |
| | | | | |
| | **Interactive sub-exhibits** | | | |
| | | | | |
| | **Non-Interactive Sub-exhibits** | | | |

**Table L - 4: Families Attractiveness vs. Holding Power**

| *Friends* | | | | |
|---|---|---|---|---|
| | | | | |
| *Exhibits* | **% Visited** | | *Exhibits* | **Holding Power (min:sec)** |
| | | | | |
| **Children in Armour** | 88% | | **Large and Small Armour** | 00:38 |
| **Replica Jewels** | 56% | | **Inscription Rubbings** | 00:34 |
| **SMA** | 50% | | **Brass Rubbings** | 00:26 |
| **Large and Small Armour** | 50% | | **Children in Armour** | 00:25 |
| **Magnetic Henry** | 44% | | **SMA** | 00:20 |
| **DeBeers Case 2** | 31% | | **Replica Jewels** | 00:17 |
| **Menagerie** | 31% | | **Menagerie** | 00:14 |
| **Inscription Rubbings** | 31% | | **Magnetic Henry** | 00:13 |
| **Brass Rubbings** | 25% | | **Diamond Interactive** | 00:09 |
| **AD 40** | 19% | | **DeBeers Case 2** | 00:08 |
| **Arch** | 19% | | **Arch** | 00:07 |
| **Helmet and Breastplate** | 19% | | **Helmet and Breastplate** | 00:05 |
| **Diamond Interactive** | 19% | | **AD 40** | 00:04 |
| **Yeoman Warder** | 13% | | **AD 1300** | 00:04 |
| **Norman Helmet** | 13% | | **Norman Helmet** | 00:03 |
| **AD 1300** | 13% | | **Yeoman Warder** | 00:02 |
| **DeBeers Case 1** | 6% | | **DeBeers Case 1** | 00:01 |
| **AD 2000** | 0% | | **Tower Power** | 00:00 |
| **Inscription and Nail** | 0% | | **Inscription and Nail** | 00:00 |
| **Tower Power** | 0% | | **AD 2000** | 00:00 |
| | | | | |
| | **Interactive sub-exhibits** | | | |
| | | | | |
| | **Non-Interactive Sub-exhibits** | | | |

**Table L - 5: Friends Attractiveness vs. Holding Power**

# Appendix M: Exhibit Photographs

This appendix contains pictures of all of the sub-exhibits in “Hands on History” in the order that they appear.


**Figure M - 1: Children in Armour**


**Figure M - 2: AD 40**

**Figure M - 3: Inscription Rubbings**


**Figure M - 4: Norman Helmet**

**Figure M - 5: Norman Arch**

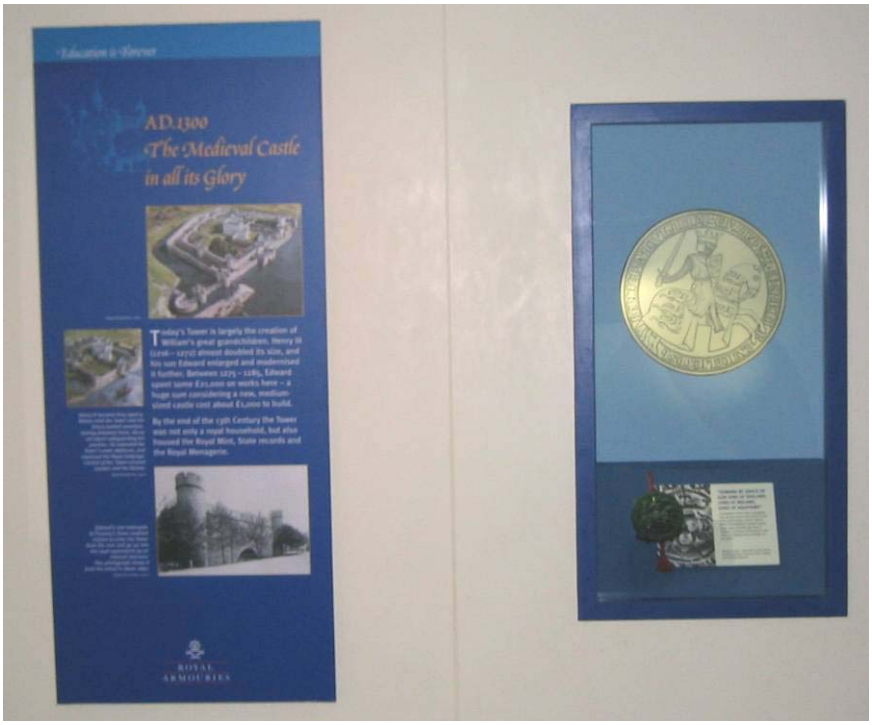



**Figure M - 6: AD 1300**

**Figure M - 7: Brass Rubbings**


**Figure M - 8: DeBeers Case 1**


**Figure M - 9: Diamond Interactive**


**Figure M - 10: DeBeers Case 2**

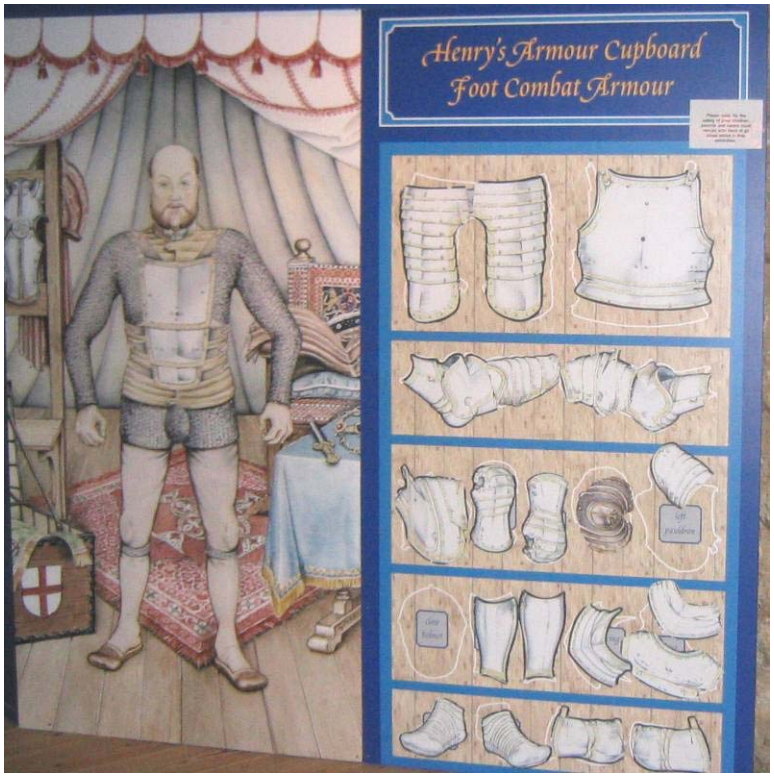



**Figure M - 11: Magnetic Henry**

**Figure M - 12: Sword, Mail, Armour**


**Figure M - 13: Inscription and Nail**


**Figure M - 14: Helmet and Breastplate**

**Figure M - 15: Large and Small Armour**

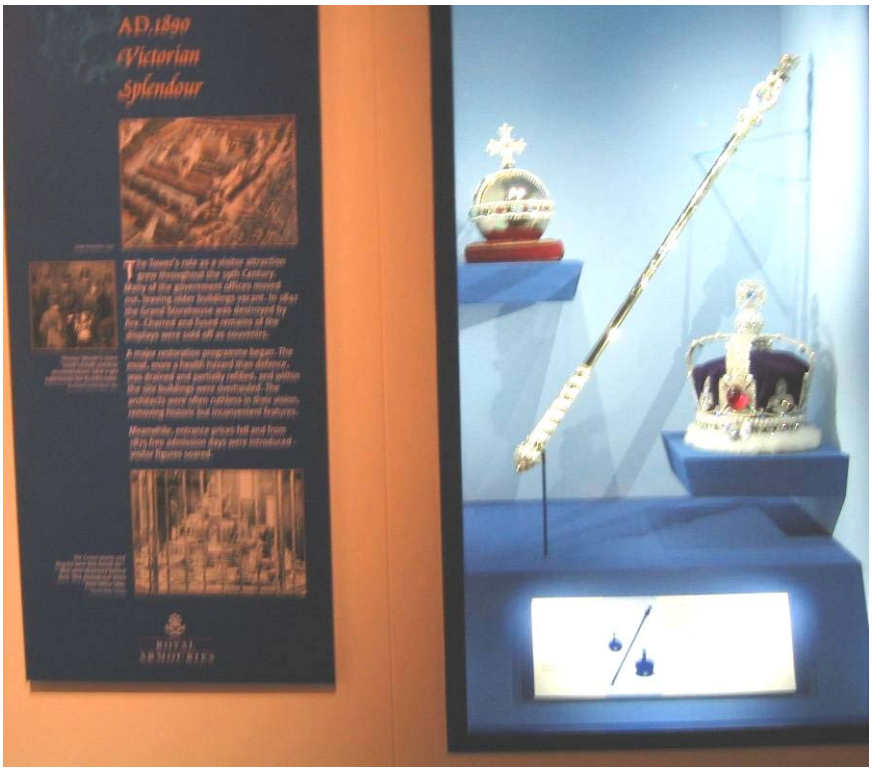



**Figure M - 16: Replica Jewels**


**Figure M - 17: AD 2000**


**Figure M - 18: Tower Power**

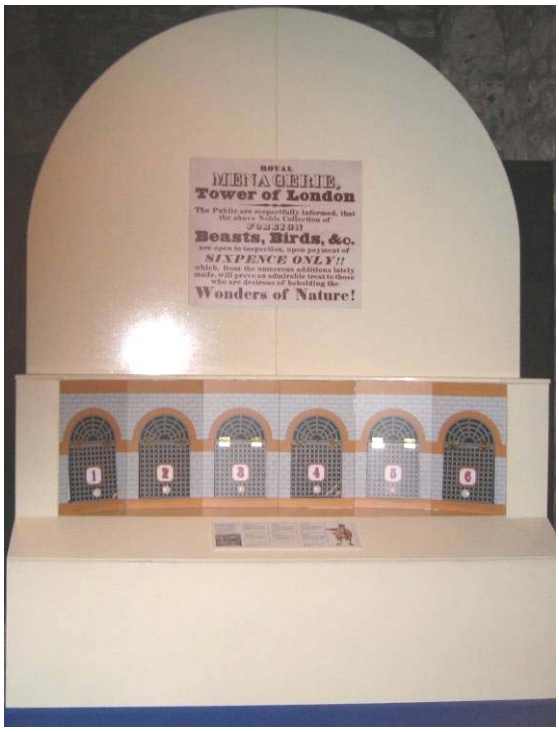



**Figure M - 19: Menagerie**

**Figure M - 20: Yeoman Warder**