DANISH NATIONAL MUSEUM: INTERACTIVE MARKETING FOR A YOUNGER GENERATION

An Interactive Qualifying Project Report
submitted to the Faculty of
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by

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Abstract

The Danish National Museum in Copenhagen sponsored a project for the creation of a new electronic marketing device aimed to support museum visitors in the age cohort 14 to 35. Internet technology was the most applicable method for creating an interactive advertising tool according to both the online survey and literature review. The project team used Flash 8 to construct a website that allows for users to create personal Virtual Exhibits with museum photographs that can be printed and shared.

Executive Summary

The goal of our project was to increase the attendance of young people ages fourteen to thirty-five at the Danish National Museum. Through the creation of a new marketing tool or the redevelopment and expansion of an existing one, the number of individuals expressing interest in the museum should increase. Initially, we researched museums and marketing tools in order to establish a knowledge base for the project. In order to understand what type of marketing tool would appeal most to the target demographic, we examined the interests of youth and popular culture. Technology played a major role in youth popular culture; thus, a technologically advanced interactive marketing tool accommodated young adult interests. The "E-Postcard" concept was initially the main advertisement we used to increase museum attendance. By using a creation-station or kiosk at the museum, a user could design a customizable postcard. Personalized information would be included in the exhibits, allowing for the customization of audio-visual media and photographs of objects and/or the user. This idea eventually evolved into what was called a "Virtual Exhibit." The online exhibit eliminated the museum kiosk concept and focused on an internet-based Flash document; users could create custom exhibitions from a library of virtual artifacts and then e-mail their exhibit to friends and family. The report was divided into four main sections: Background, Methodology, Results and Analysis, and Conclusions and Recommendations.

The Background section of the report considered three main concepts: Museums, Technology and Marketing, and Digital Multimedia Design. The purpose for museums was explained along with an in-depth description of the Danish National Museum. The functions of the museum and current advertising methods were specifically focused on to provide an updated understanding of recent attendance patterns of throughout the museums in Copenhagen. The

Danish National Museum suffered a decrease in attendance beginning in the early 1990s and continuing until 2005. During this time, there was no free admission into the museum. Once the implementation of free admission was reinstated in the spring of 2006, attendance began to once again increase. Attendance at the museum was lowest among younger people, particularly teenagers, emphasizing the need for an incentive to attract this demographic.

The technology and marketing segment focused on the role technology played in popular culture along with marketing demographics. Several arguments stated that the role of technology in popular culture was a key area of interest for our specific demographic. The internet itself was a major marketing tool, capable of combining current technology with new forms of media. We also researched digital multimedia design in order to exploit the possibilities of internet technology in attracting young adults to utilize the Danish National Museum.

The project team investigated existing e-postcards and their content in the digital multimedia design section in order to build an understanding of the creation and implementation of the multimedia. If we could effectively capture and store audio, still images, and videos, they could be uploaded and sent over the internet to friends and family. The information proved useful for the proposal of a "kiosk" model of the Virtual Exhibit; a station would be positioned in the Danish National Museum, allowing individuals to create and send complex versions of the Virtual Exhibit. We investigated internet languages that would aid in the creation of the website and concluded that Adobe Flash would be ideal for the project. The language had the ability to handle a wide variety of multimedia necessary for the Virtual Exhibit.

The Methodology section described how the development of the Virtual Exhibit would be executed. The preliminary design ideas are included in the preliminary Virtual Exhibit and the ideas are based on the original background information our group gathered. The design for the

Flash program included two main contexts; the personal context analyzed how user personalization could be incorporated into the exhibit while sustaining the museum context of exhibits and descriptions. Basic plans of the Virtual Exhibit included surveying concepts and a simple outline of the project's plan.

The Results and Analysis segment of the report explained relevant data gathered through surveys and further research. A survey was distributed to the recipients of a history enthusiast's newsletter in order to gather data that illustrated the interest of Danish citizens in internet technology and gave some limited suggestions about the interests within our 14-35 demographic. All the individuals surveyed had browsers capable of running Flash applications and the majority of the survey group stated that they would create and send a Virtual Exhibit. The survey further indicated that topics such as religion, death and punishment, jewelry and Danish historical events most interested museum-goers. Creating the Virtual Exhibit required the team to master exceedingly complex commercial software, a process that entailed extensive trial and error solutions to many difficult programming steps. Photoshop was also used to create the photographs used in the project. The final product was pushed along to the last step, namely the saving and emailing of the end product to potential visitors. That step at the end of the project still awaited solution.

We described three options in the conclusions and recommendations section: the website can be maintained as it was presented, professionals could be hired to create a more advanced exhibit, or a kiosk might be set up in the museum where visitors may create Virtual Exhibits. The final product of the Virtual Exhibit will be given to the Danish National Museum and they can either upgrade it or use the current product. The main focus of this project was the Virtual Exhibit itself. Mastery of several new software programs was required to achieve the project,

but the very last step that allows users to save their exhibits and ship them via email to friends, has not yet been accomplished. The process to create the saving capabilities in provided for the museum's use if they choose to continue the development of the Virtual Exhibit. Thus, the last recommendation would call for the employment of a professional outside service to solve the saving and mailing issue. The extensive interactive nature of the "Virtual Exhibit" process seems to deeply involve users, and motivate them to explore other aspects of the Danish National museum. Email dissemination of use-created Virtual Exhibits will surely multiply that involvement and motivation.

Acknowledgements

We could not have completed this project without the constant attention, resources, and advice of Charlotte Jensen of the Danish National Museum's Communication Department. We'd also like to thank Professor Knud Hansen for graciously providing us with office space at the Engineering College of Copenhagen.

At a crucial moment in the evolution of this project, we were introduced to Tobias Jørgensen through the intervention of Professor Michael Jørgensen at Danish Technical University. Tobias Jørgensen swiftly solved the technological problem, enabling our project to be saved and emailed to interested friends and family. We would also like to thank Christian Bryan for setting up web space for our project.

Finally, we would like to thank Dean Tom Thomsen and Professor Peder Pedersen at WPI for preparing us for the project in Denmark. We would like to provide a special thanks to our advisor, Professor John Zeugner who consistently gave us advice and direction during our experience overseas.

Table of Contents

Table of Figures

1. Introduction

Boring, bland, dry, old and even painful – all ways in which you might describe your last trip to any museum. Fun, exciting, thrilling and stimulating – wouldn't you prefer to express your trip to a museum in this manner? The Danish National Museum in Copenhagen is working to change these views. Currently, the Danish National Museum is in the process of developing an effective marketing tool that would increase overall interest, publicity and attendance for the museum. The museum is interested in pursuing a project which would take advantage of current technological trends and consumer products which target individuals in the age cohort 14-35 years old.

With evolving technological advancements and varied interests among the museum's target audience, the current staff at the museum is looking into more effective methods to reach out to a younger generation. They hope to educate Danish youth with the interesting information found within the museum.

In order to develop an effective marketing tool, this report will investigate different forms of technology and marketing, popular culture and effective ways to peak interest among the target audience, and current marketing trends within the museum community. Using this information, an appropriate marketing tool or series of tools will be selected and developed for the Danish National Museum.

2. Background

Marketing for museums incorporates many aspects of businesses and the technological advancements they employ. By utilizing the various methods of advertisement and current

technology, these organizations can connect with individuals who were not previously interested in the museum's collections.

2.1 Museums

Why do individuals go to museums? Perhaps a research project requires primary source information or maybe an exciting exhibit is temporarily being shown. The International Council of Museums defines a museum as "an establishment in which objects are the main means of communication." (Museums, 203) This concept is an extremely fundamental description of a museum's purpose, but it expresses the two main purposes of a museum, objects and communication. According to museum directors in the 1970s, the main purposes of a museum are to educate the public about the past and conserve cultural and/or scientific heritage. These goals were foremost of providing inventive experiences, encouraging social change, and providing entertainment. (Museums USA: A Survey Report, 23) Another perception of museums focuses on the preservation and conservation of artifacts, developing a central research facility, and creating an educational agency for the public. Much debate has occurred over features that extend beyond the basic responsibilities of preservation and education. In the United States, extra events and presentations that exceed the traditional role of a museum have been developed that can either help or harm a museum's progress. (Museums, 1) The museum hopes to develop an outreach program that emphasizes the significance of an artifact's historical context to create a more positive reaction toward museum visitation habits.

Ideally, a museum offers both learning and recreational opportunities to its visitors. There is a common culture, "a reawakening to full partnership in life on earth after centuries and millennia of debilitation under oppressive foreign regimes." (Museums, 193) As the quotation

explains, the purpose is to embrace the history and culture of a country through the preservation and presentation of artifacts. A museum is not a final resting place for artifacts; rather it is a connection for the past and present. As the popular saying states, we as a human race should learn about our past mistakes for the betterment of our future. A museum is a key to our past, in a sense, because it allows for the mass viewing of history.

2.1.1 Attendance

The attendance of a museum correlates to the effectiveness of the collections' presentation and content. In many cases, certain groups of individuals are attracted to specific themes. There are museums of science, art, cultural history, and other various concentrations. Overall, science museums have the greatest attendance, followed by history and art museums. (Museums USA: A Survey Report, 130) Science museums create an interactive atmosphere, allowing guests to apply what they are learning.

There are various reasons to use a museum's resources. The main groups of individuals attending the museums include the general public, followed by school groups. (Museums USA: A Survey Report, 133) Education is one of the priorities of a museum, expressed by the visitation of youth groups. Generally, groups of children are brought to a museum for a learning project. What happens once individuals are no longer in the youth educational setting? Young adults have grown beyond the group field trip stage and are no longer required to attend museums. The mentality of different age groups leads to the concern of maintaining the attendance of young adults.

2.1.2 Current Marketing/Publicity Methods

Advertising is the most fundamental method of increasing the attendance of young adults. It is commonly used by 70% of museums to encourage general attendance. (Museums USA: A Survey Report, 137) Marketing tools can include a range of products, such as websites, games, paper advertisements, and even special tours and exhibits. With many marketing tools available to businesses, it can be difficult to determine which publicity method will be most useful for a specific museum. For example, an art museum would prefer to have a gallery of temporary paintings while a science museum might incorporate an interactive project to explain theories and laws. A collection should provoke the public's interest while enhancing their knowledge.

2.1.3 Museum Renewal

There is a Twelve Point Program for Museum Renewal discussed by Alma S. Wittlin. Aspects of the museum must be reevaluated periodically so that the focus of the organization is fully understood. As stated above, a connection must be created between the public's interest and the relics on display. There should be a uniqueness that generates interest and distinction from other collections. As a man-made institution, there should be continuous development to create a learning environment for the attending visitor population. Financial costs should be considered in the development and advertisement of new collections. (Museums, 203-219)

2.1.4 Budgets

Budgets are vital to a museum's success. When considering the development of any new collection or advertising method, the manager must create a plan to fund all events within the museum. A written statement must be provided, explaining the necessity of the project in order

to attain the necessary money. Objectives and goals must be clearly developed in this summary and the exact amount of funds should be explained. (The New Museum Registration Methods, 209)

2.1.5 Danish National Museum

The Danish National Museum is Denmark's largest museum, with artifacts and information conveying the cultural history of Denmark. Built in 1743 by Nicolai Eigtved, the Prince's Palace houses artifacts from the Stone Age to present day. The building itself is adorned with artifacts from the 18th century and is located in Copenhagen. (The National Museum of Denmark)

A variety of artifacts are shown within the museum, including the Royal Collection of Coins and Medals, international artifacts, Danish residence exhibits, and temporary exhibitions. A Children's Museum is also incorporated into the museum experience. Created for ages 12 and under, this section is an interactive area where youth can experience history by seeing the view of a Viking ship or learning how various cultures live. (The National Museum of Denmark)

The museum offers many interactive projects for visitors. Specifically, a guest can choose from programs of film, children's activities, music, lectures, special exhibitions, guided tours and workshops. Presenting these opportunities to the public allows for Danish citizens to interact with their heritage. (The National Museum of Denmark)

The Children's Museum within the National Museum distinctly portrays the focus on education. Groups of various ages may experience an interactive visit by wearing clothes from various time periods or practicing rituals of the past. The materials used for these projects are replicas of actual artifacts. Since the children can associate with the materials used by our predecessors, they attain an experience that is irreplaceable and cannot be attained with many of the authentic exhibits. (Charlotte Jensen)

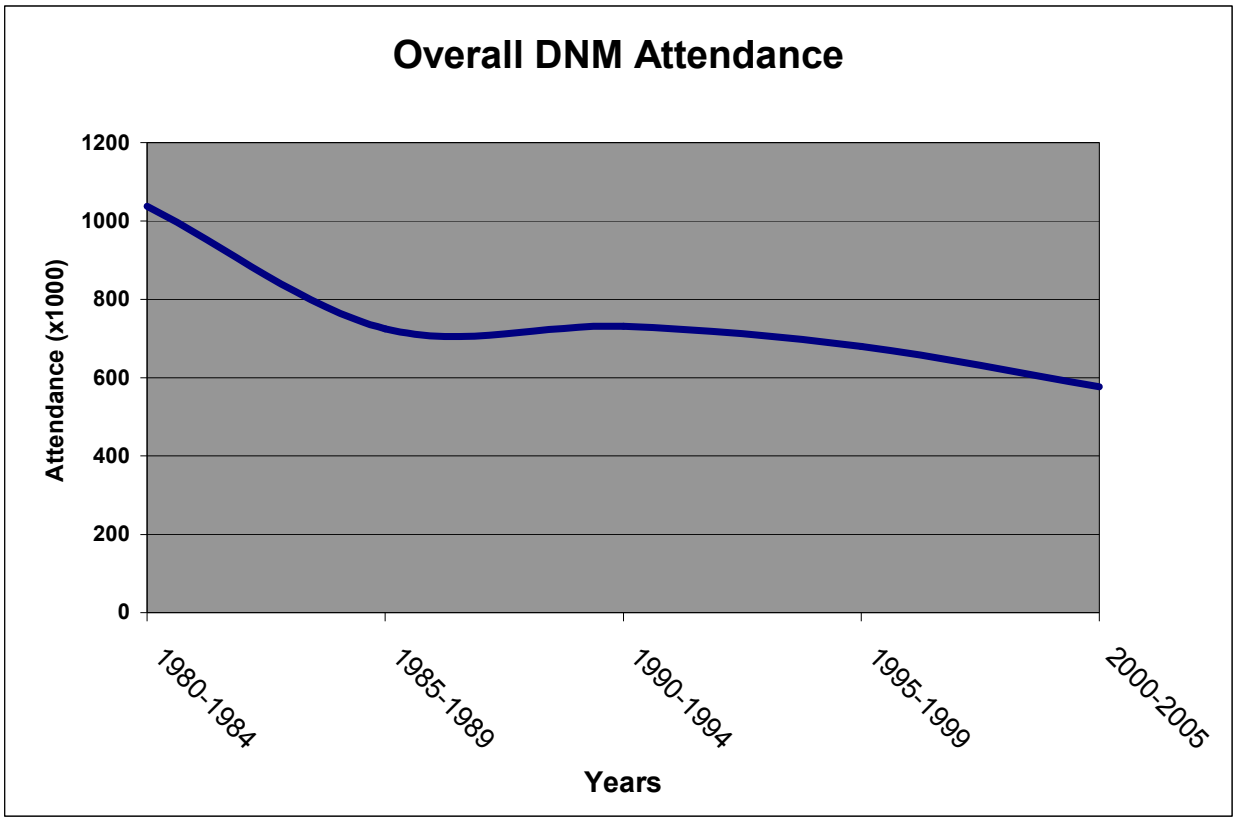
The National Museum offers special exhibits that are a short walk away, including the Brede Manor, the Victorian Home, and the Little Mill. These homes offer an opportunity to see Copenhagen living arrangements as they were in the 18th, 19th, and 20th centuries. A current temporary exhibit on Tycho Brahes Verden was also available within the museum for the public to view during the time of this project. (The National Museum of Denmark)

There are museums connected to the National Museum, including the Open Air Museum, The Museum of Danish Resistance, and the Danish Music Museum. The Open Air Museum offers the experience of being able to see a community as it was during the time of Hans Christian Andersen; visitors can see how a family lived or what type of work was common. The Museum of Danish Resistance focuses on the resistance movement during German Occupation during WWII, providing insight into resistance activities and the lifestyle of individuals. The Danish Music Museum has a collection of musical instruments from all over the world. Instruments from the Renaissance to today are revealed, exploring the development of music. Admission to all of these museums is free. (The National Museum of Denmark)

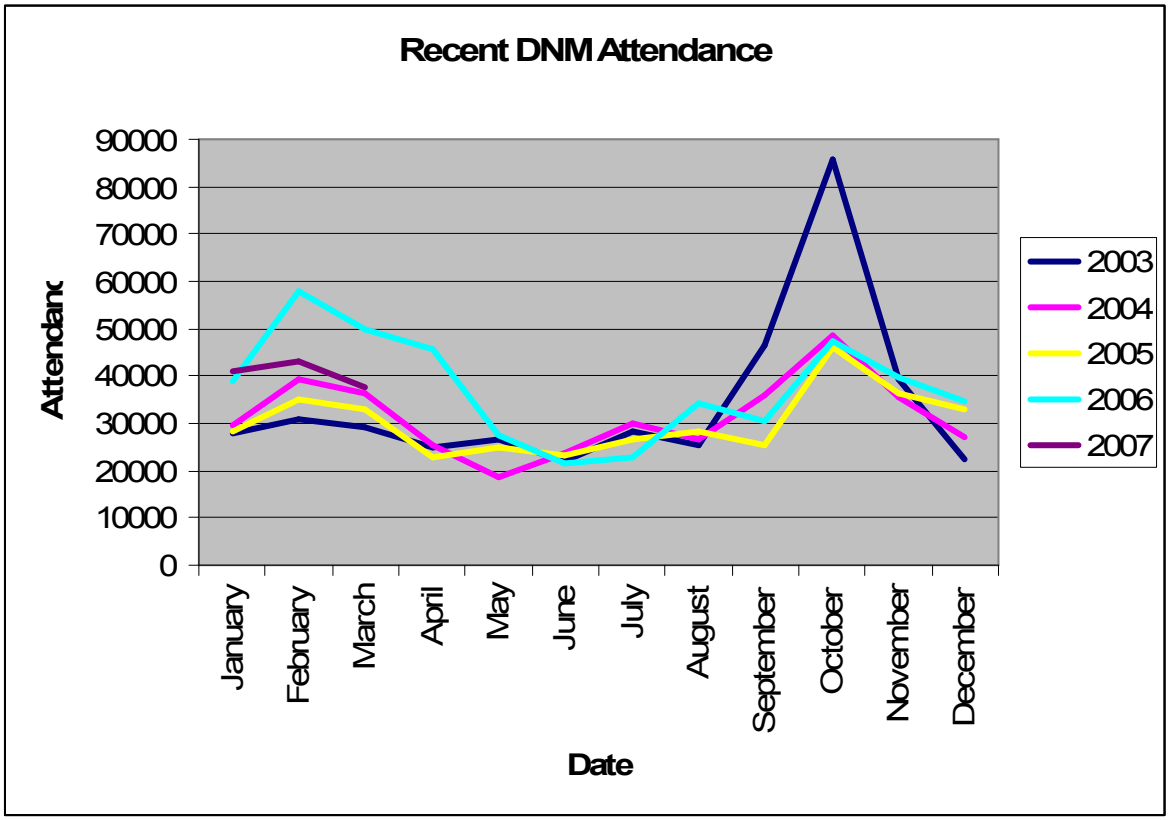
2.1.6 Danish National Museum Attendance

Attendance for the Danish National Museum has varied over the past few years. Prior to the spring of 2006, the museum was available to the public for a small fee. In the fall of 2003, the museum offered free attendance for two months. Due to financial restrictions, the admission fee was reinstated. In the spring of 2006, the museum was then able to offer free admission to the public thanks to a grant given to the museums. Prior to this change, the museum attendance had been slowly declining. By making the museum more easily accessible to the community through free admission, the attendance has consistently been increasing. Since then, attendance

has remained higher. According to Charlotte Jensen, it is now simpler to go to the museum even if there is not much time allotted for a visit. Rather than pay to visit everything within the museum, guests can now return during their own time and walk through at a leisurely pace. It has become more effective to peruse an exhibit opposed to quickly seeing everything. (Charlotte Jensen)



Graph 1: Overall Danish National Museum Attendance (Denmark in Figures)

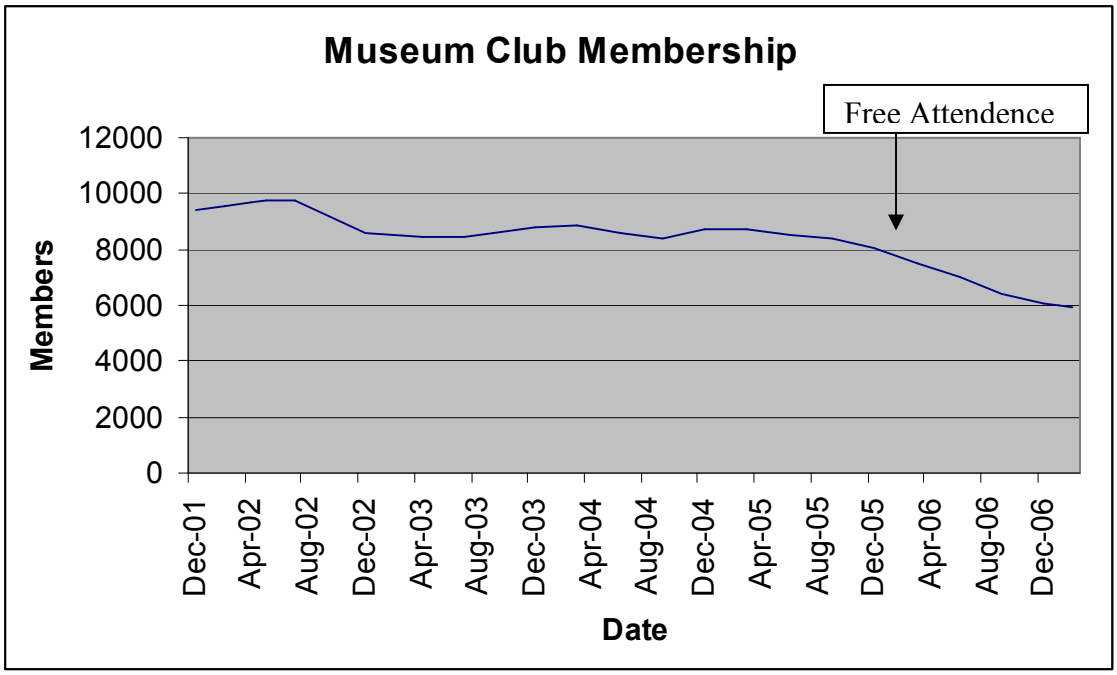


Graph 2: Recent Danish National Museum Attendance (Danish National Museum)

2.1.7 "Friends of the Danish National Museum" Club

The Danish National Museum has programs intended to encourage participation at every level within the audience that they market to. One such example is the museum club, titled Friends of the Danish National Museum. This club has members who can participate in various extra activities and events not available to the normal museum visitor. For a small yearly fee (between 125-300 kr. depending on age) the participants get special opportunities which include discounted prices on group trips to historic sites, first pick of museum sponsored tours and excursions led by famous professionals in their respective areas, and even private guided tours of sections within the museum usually not accessible to the general public.

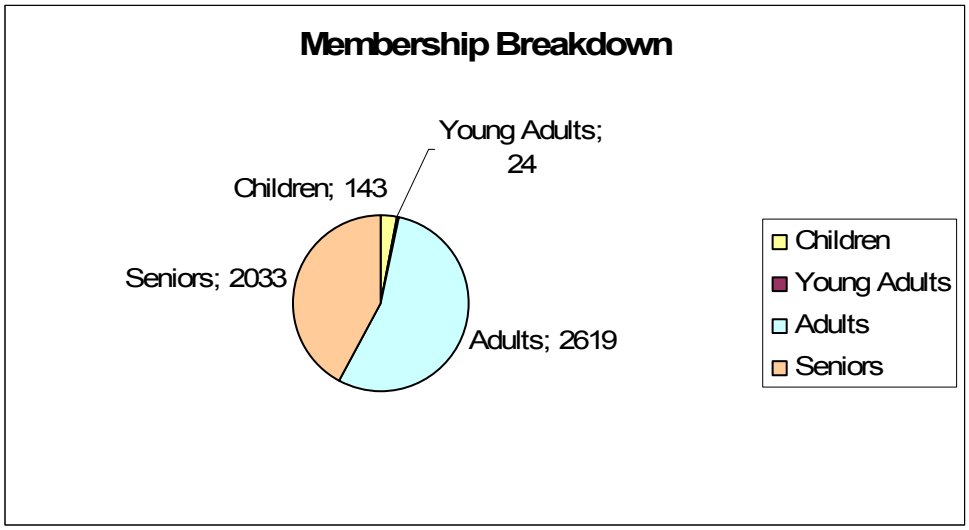
The problem that the museum club is currently facing involves one of their most attractive aspects now being obsolete. Before free attendance was instituted in the spring of 2006, museum members were given discounted rates for general admittance into the museum. Since the introduction of free attendance, membership in the club has dropped dramatically. A graph below shows the total museum club membership since December 31, 2001.



Graph 3: Total Danish National Museum Club Membership (Pedersen, Knud)

Currently, the largest groups of museum members are of ages 26 and over. The museum is trying to cater to the needs of its younger audience by introducing a new program for children that gives them a gift set when they join; this incentive includes a "museum passport" that provides a free gift when a certain number of stamps, or visits to a museum, are achieved. The hardest audience to reach and the one with the lowest membership rates is teenagers. Currently, the museum has only 24 teenage members and would like to do something to increase this number. Knud Overgaard Pedersen, Museum club director, stated that it was hard to reach this

group because they are more interested in their phones and the opposite sex than they are in the museum exhibits. A graph outlining the current museum membership based on age is included below.



Graph 4: Danish National Museum Club Membership (Pedersen, Knud)

2.1.8 Museums in København

The Danish National Museum works with Museums in København, also known as MIK. This organization coordinates with museums across the city to create planned trips for visitors. There are various options when planning a trip; a family can select a themed visit, seeing exhibits from multiple museums, or they can choose to attend a special temporary exhibit. The group is useful for the advertisement of museums and a simple method of relaying the exhibit highlights throughout the city.

The MIK website offers many events and projects for the public in Danish and English. It contains interactive games developed in Flash that encourage children to become more involved in history. Although our project will not produce the same games as MIK, it provides an excellent example of what can be created using the Flash program.

2.1.9 Similarities/Differences among Museums

Recently, the UK Department for Culture, Media and Sport developed an online application that allowed for them to relate to new audiences. One of the main ways the department was successful was the development of an interactive program. If an individual is able to actively become involved in a project, that person is more likely to continue visiting. By relating to the audience and creating an environment that grasps their interest, a successful interaction is created. According to the UK Department for Culture, Media and Sport, there are five stages to interactive projects. The audience must be interested, engaged, guided, able to communicate and capable of creating or applying what they have learned. (Attaining the Holy Grail) These components will be taken into consideration throughout the completion of this project and will guide the design of an interactive Virtual Exhibit.

2.2 Technology and Marketing

2.2.1 Technology and Popular Culture

Currently, we live in a society that is continuously changing and restructuring itself based upon the newest breakthroughs and technological findings. Due to the nature of this new digital society, "only electronic communications such as the internet or the television can provide information quickly enough to be even remotely current." (Krug, 2005) This rapid pace of change has caused many of our original learning and communication techniques, such as books, written journals, magazines and newspapers to be replaced with an increasing number of digital counterparts. We have started to even define who we are as individuals and what we think based upon these pieces of technology. "Rather than arising out of local, human experience elaborated

through conversations with other people, language now comes prepackaged and reflects not the needs of human beings but the values of capital, the machine, and the technological system." (Krug, 2005)

It is true that nowadays people tend to cite more quotes from the latest television or internet commercial then they would quote Shakespeare or Twain. The value of this trend to concentrate more of our reflective energies toward what is seen on television sets and computer screens has given rise to a bombardment of both passive and direct digital advertising. Companies around the world have learned to "ride the wave" of this new technology explosion with ads of almost every kind in every place imaginable. "Already, e-books, e-zines, and especially advertising with its ubiquitous pop-up and banner ads, are teaching a whole new generation that knowledge, news, and all other social communication, even e-mail, come with ads." (Krug, 2005) So why can we not just insist to stop with this nonsense of being advertised to day in and day out? Why do we not simply throw down these advanced marketing devices and resist this media overload? The answer to that is in fact tied to the very fabric of our social order. "It is not simply that what is important for us to know has changed; our way of knowing has altered as well." (Krug, 2005) A child born of the 21st century will most likely not take the time to look up facts about Africa or weather patterns in their respective encyclopedias and written books when such a wealth of knowledge is at one's fingertips in the form of the internet. This child will be one born in a world of advanced technology and will strive to attain more and more of it as they progress through life.

So why must we as a society be so attracted to our gadgets and gizmos that we would endure these countless pop-ups and TV ads? The answer is actually one that can be said for any generation. Whether it's reading a book, surfing the web, or playing a video game the reasoning is all the same; we want to escape. "…Every aspect of telecommunications tends to draw one

away from the local and concrete and into participation with a social world which cannot be physically present and which is desirable because it is more immediate, more changeable, more ephemeral, and finally more entertaining than the real." (Krug, 2005) This escape from the shackles of our palpable world into one in which we have ultimate control is what drives our desire for technology. Various arguments have disagreed, stating that technology lacks the personalization needed to construct a concrete project, or others asserting that technology is a corrosive influence. Still, we as a group feel that the age cohort of 14 to 35 will be attracted to modern forms of technology; understanding this attraction will help us better design an attractive Virtual Exhibit.

Another reason why we feel the need to constantly be connected to each other is the fear of loneliness. "…One is always capable of contacting others, but therefore one is always contactable; one need never be alone, for isolation and loneliness are too reminiscent of the alienation and scarcity of meaningful social contact in everyday life for many people. So, one purchases ever more advanced communications to be more efficient, more contactable, more wired into the system." (Krug, 2005) We buy our pieces of technology so that we can be connected to an infinite amount of people, but at the same time with the flick of a switch or the push of a "power button" we can instantly attain an infinite amount of privacy. In conclusion, the newer, faster, more complex a piece of technology is the more capabilities it has to link us into this virtual world and the more we as a society feel the need to get it. This need can certainly be exploited in our Virtual Exhibit idea. If we can create a product that would make people feel more connected to their friends, then they would be more likely to be attracted to the museum's facilities.

2.2.2 Internet Capabilities

The amount of uses that the current internet contains is a staggering number. The most engrossing and capturing uses to the internet audience, however, involve the use of multimedia internet programs and applications. "Strictly speaking, 'multimedia' implies simultaneous use of more than one medium, so that a telephone conversation would not qualify while a video-phone conversation (which includes audio), and e-mail text message with an attached image, or an electronic game (with animated graphics and sound) would." (Weinstein, 2005) The theory behind the concept of multimedia applications and presentations is that they involve the user more because they tantalize more of their senses. Normally a good rule of thumb with multimedia technology is that the newer, more advanced forms are the ones that the audience tends to flock towards. "The phenomenon of digital audio and video, made possible by rapid advances in coding techniques and storage and computing technologies, is a principal technical foundation of multimedia technology now and in the future." (Weinstein, 2005) These new "high definition" programs are leading the way into a new form of multimedia in which one can become completely engrossed in what they are doing online. It is this form of engrossment that we wish to include within our Virtual Exhibit. If we can successfully make a product that can fully engage the audience to a point where they are only focusing on the exhibit, then we may speculate that the recipient will be equally engrossed.

While multimedia applications and utilities are a good start in finding and hooking a potential audience there are even more advanced forms in which messages can be relayed to a participant. These sorts of interactions give rise to a new form of communication called interactive multimedia. '"Interactive multimedia" refers to those experiences, or manipulations of multimedia objects such as images, movies, songs, or multimedia documents, in which the

human participants have to take and active role." (Weinstein, 2005) When coupled with digital audio and video components that can easily be manipulated and controlled by the user, this form of internet multimedia can engross the participant more than anything that has been previously invented. Some great examples of such tools are online computer games, which are discussed as alternatives in Appendix A.

The only problems the creators of these new digital programs encountered were that there seemed to be too many ways in which things could be done, and if some sort of order wasn't brought to these limitless possibilities nothing concrete could ever be produced. One group in particular took charge of creating a standard in which all digital programs and communications could be based on. The DAVIC (Digital Audio-Video Interaction Consortium) was created in 1994 to allow different companies who joined to agree upon a standard format. (DVAC website) While the consortium itself eventually died out it set the standard for technologies which include: Movies on Demand, News on Demand, Karaoke on Demand, TV Listings, Home Banking, Broadcasts, Games, Distance Learning, Video Conferencing, and Virtual CD-ROM. (Weinstein, 2005)

In order to take advantage of these new capabilities, the computer system one uses must be relatively new in order to keep up with the higher stresses that these digital programs put on the CPU (Central Processing Unit) and memory. Ideas to incorporate these new applications have even started to go beyond the standard computer. "Newer ideas include foldable writing and display surfaces, a scanning bar to capture documents, speech control, built-in video cameras, a 'heads up,' see-through display in the user's eyeglasses (or projected directly on the user's retina), and even a virtual keyboard and sketching pad relying on light data gloves and finger movements on any flat surface." (Weinstein, 2005) It is obvious that in order to compete in

this new age of technology, the established businesses must take full advantage of the "multimedia internet."

2.2.3 Marketing a Museum

A trip to the museum is increasingly becoming a lost activity for many of today's youth. Most would rather play video games, watch television or go outside and play than spend an afternoon in a dreary museum. As a consequence, many museums have seen a drop in visitation and with that a drop in funding from both the government and the private sector. "Marketing approaches have been used to increase visitor numbers and to encourage, change and expand the museum role from one of custodial emphasis to one of marketing. Hence, museums are developing marketing techniques to help them become more successful." (Gilmore & Rentschler, 2002)

One strategy involves combining an improvement into two aspects of the museum. First is improving the internal performance and functionality of the staff. Co-operation is one of the key aspects of this strategy. The directors of publicity and marketing should effectively communicate with those in charge of managing and maintaining the exhibits so that the current advertisements the museum is presenting to the public are accurate. If there is any technology involved inside the museum, such as a website, E-Kiosks, and computer systems, then the staff must effectively communicate what the needs of the museum are to the person or company in charge of maintaining that piece of equipment or technology. "Temporary exhibitions are regarded as being a major method of attracting both new and repeat visitors." (Gilmore & Rentschler, 2002) Once again, in order to effectively market and maintain these temporary exhibits communication is essential.

The second aspect of effectively marketing a museum is its external performance and perception. This breaks down into three sections which are education, accessibility and communication. Education is the most important function of any museum; it is in fact the purpose of it. "The education of the public on the nature and scope of collections and exhibitions is central to the entire museum service product." (Gilmore & Rentschler, 2002) If the targeted audience of a museum doesn't learn anything from their trip, then the museum, its staff, and its sponsors have failed as a whole. Accessibility is another part of this strategy which involves not only the ability to get to the museum, but also its layout. A museum in which one must walk from one end to another several times to see related pieces of exhibits is obviously not well designed. The last piece of this puzzle is communication and how the information you require from the museum is relayed back to you. A subcategory within communications includes entertainment. Interactive exhibits and ones that spark the audience interests are an integral part of the communications aspect. (Gilmore & Rentschler, 2002)

The illustration on the next page summarizes the previous points in an easy-to-understand flow chart.

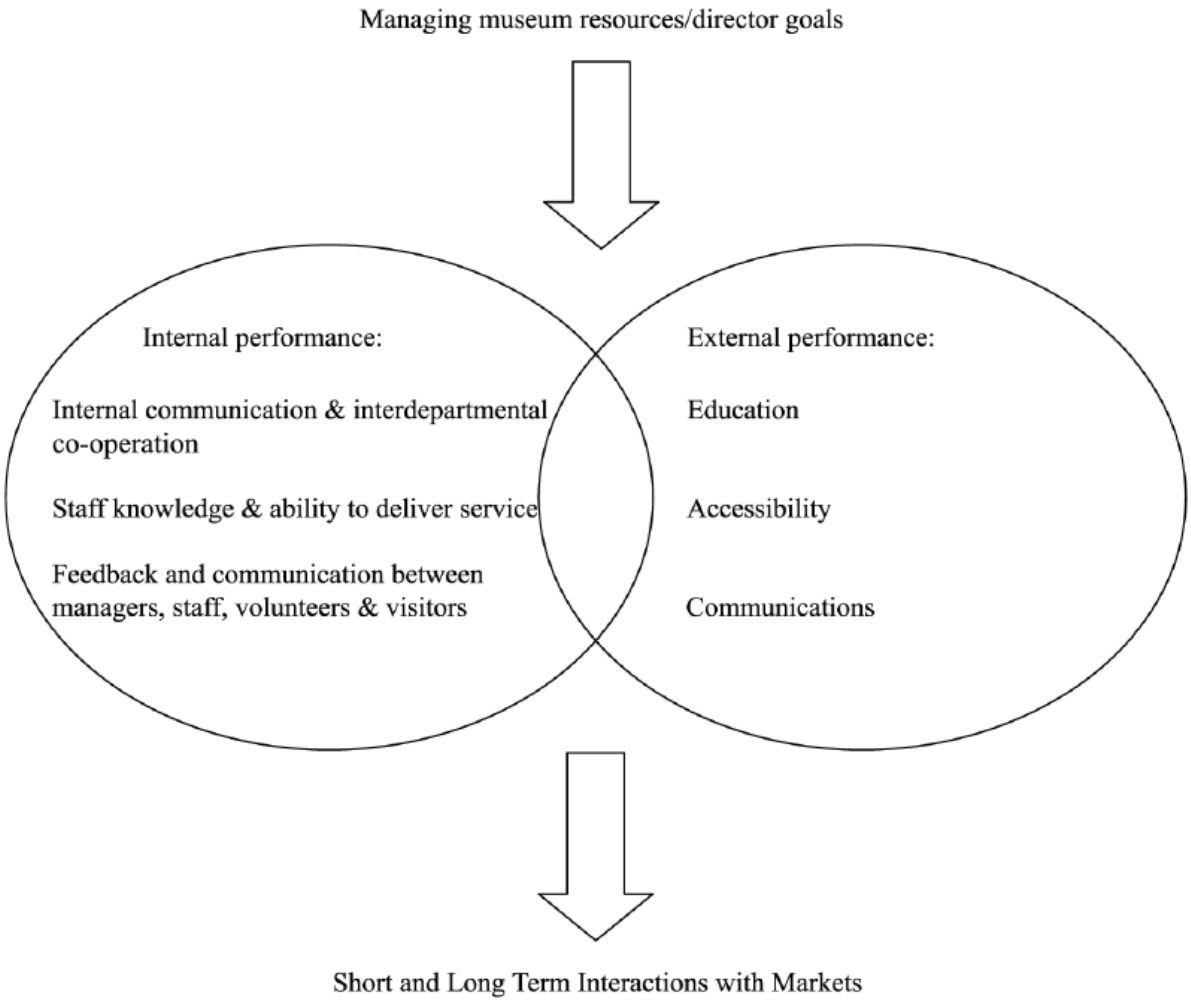


Figure 1: Marketing Flow Chart (Gilmore & Rentschler, 2002)

2.2.4 Marketing to a Younger Audience

When deciding the most effective way to market your product to the consumer you first have to understand the needs and wants of that consumer. Teenagers today have different sets of needs and wants from ones in the 80's and 90's. In order to find out what those are, one needs first hand knowledge from the audience. Recently the American Library Association conducted

a survey in 10 different libraries to learn how to improve the experience of a library visit. Museums have much of the same goals and problems that a library has, so in looking at the results from this survey it can help a museum understand how to better market itself toward this younger crowd. One of the findings of the survey stated, "Teens in all 10 planning-grant libraries criticized library access to computers, as well as the quality of computers and software. Complaints centered on 'long lines' to access library computers…" (Meyers, 1999) This one bit of information can drastically help a museum if it is struggling to keep its younger audience entertained. Computer and interactive systems in museums should be fast and reliable as well as contain the latest technology in order for teenagers to find them interesting. There should also be enough of these systems available so that they don't get frustrated waiting in line to use one. So having these computers is a foundation, but something should be added to them to make them even more attractive to teenagers. "…nearly 90% of teens say the internet is 'in.' This is an astonishing figure, higher than the percentage of those who say partying, dating, or shopping are 'in'." (Meyers, 1999) The addition of the internet to any piece of marketing technology is essential to attracting more attention and "hype" from its users. Briefly defined, when something is "in" it means that a majority of the targeted audience believe that it is trendy and cool.

More research also found that many visitors of libraries are unhappy when the library is too quiet. Some background chatting or ambience was desired by most who participated in the survey. Perhaps museums could incorporate a musical background in their exhibits or even some form of automated tour system. Video games also seemed to be a recurring desire among this age group and some sort of game within a museum could provide an added sense of adventure to the experience. (Meyers, 1999)

2.3 Digital Multimedia Design

2.3.1 E-Postcards

The focal idea of this project was the development of a Virtual Exhibit for the Danish National Museum. The idea was loosely based on the concept of an "E-postcard" in that it included customizable content that pertained to the Danish National Museum, which could be sent to various recipients via e-mail. Therefore, it was necessary to research existing e-postcards in order to provide a foundation for the development of the Virtual Exhibit.

E-postcard is short for "electronic postcard," referring to the fact that the postcard is fabricated and sent digitally over the internet between different computers. The form and complexity of these E-postcards varies considerably from simple images sent via e-mail to complex greetings with interactive animations and sounds that can be hosted remotely and accessed from just about any modern computer with an internet connection. A search of "E-postcards" on Google.com came back with a multitude of E-postcard websites ranging from region specific E-postcard sites to websites with thousands of different designs for wide variety of applications. Since E-postcards are no longer limited to the confines of paper and pen, E-postcard sites often include cards with animation and music or speech, taking full advantage of the capabilities of modern computers. These added dimensions to the conventional postcard can allow for further expression of the emotion, opinion, and thoughts from the individual sending the card. An increase in expression can increase the character and personality of the card, but often times these cards are still prefabricated by some other individual (with the exception of some personalized text) and thus lose some of the personal connection between the individuals. Thus the development of the Virtual Exhibit included a heavily customizable element where the user could design his or here own exhibits with their own selection of artifacts. This effectively

increased the level of personalization and interactivity of the marketing tool and thereby enhanced the overall user experience. Another way to increase the level of personalization these marketing tools allow for would be to implement images, audio, and/or video of the individual(s) using the tool. The next section of background investigates methods of capturing and applying images, audio, and video to the Virtual Exhibit

2.3.2 Audio, Video, and Imaging Equipment and Software

The implementation of the Virtual Exhibit shifted from a "kiosk" model, which would entail a station at the Danish National Museum where the user could create and send his or her Virtual Exhibit, to an internet accessible model, which would allow any user with internet access to log on and create the Virtual Exhibit from his or her own home. Thus the application of personalized video, audio and imaging became much less feasible in the current model. Never the less, the following section provided important information in the proposal of the possible construction of a Virtual Exhibit kiosk in the museum.

Capturing audio can be a difficult and expensive undertaking, however, for the purpose of this project only a short sample of speech would need to be captured. This can be done easily and inexpensively. For this application a very simple microphone built for personal computer use could be implemented. These types of microphones can cost as little as three dollars US according to a search run on www.newegg.com, a leading online electronics and computer retailer. Though the user-friendliness and quality of these microphones may vary, sufficient calibration and arrangement of the audio system could produce a satisfactory and consistent audio sample of a short greeting from the individual sending the Virtual Exhibit. When it comes to storing recorded audio in digital form the most common way of encoding sound is in the .wav

format. This format is lossless (meaning no data is lost during capture). The downside is that the files tend to get quite large; however, for postproduction purposes the lossless format is ideal because no information is destroyed. (Follansbee, 2004) For the applications of this project, the samples will be quite short and thus the size of the file will vary very little with different file formats such as .mp3 or .aiff. Also, if the audio is to be associated with a video, the audio encoding will be coupled with the video encoding and concern lies with the video encoding, which will be addressed in the next section.

Video capturing can also be a very complicated and pricey endeavor. Also, capturing video digitally can create very large files, which would inhibit the storage and transfer of these files over the internet. Thus quality must be sacrificed in the name of feasibility. The most practical video capturing device would thus be a cheap, low-quality, and small camera. Webcams meet these criteria very nicely. Webcams still vary widely in quality so selecting an appropriate model will depend on the size, quality, and length of the desired video file. For the sake of comparison a video length of ten seconds will be assumed (long enough for the user to leave a short message). To now compare the size video files various types of video encoding will produce one can look at the bit rate. The bit rate is a measure of the amount of data (measures in bytes) a particular video file requires per second of video (for a ten second video we need only multiply the bit rate by ten to get an estimate of file size). Raw video data stored in the form of motion JPEG has a bit rate of 30 Mbps (megabytes per second). (Weinstein, 2005) The streaming JPEG format would produce a 300 Mb ten second video file, which is far too large to easily manage and send through the internet and produces an unnecessarily high level of picture quality, so clearly some form of compression will be desirable. MPEG, short for Motion Picture Experts Group, is a widely used and accepted way of encoding video into smaller more

manageable file. There are several different MPEG formats that can be used depending on desired file size and quality; the MPEG-1, which can produce VCR-quality video at up to 1.5 Mbps, MPEG-2, which produces Broadcast-quality video at 4-15 Mbps, and MPEG-4, which produces low quality video at a bit rate as low as 32 Kbps. (Weinstein, 2005) A high quality ten-second MPEG-2 video would be as large as 150 Mb, which would be too large to store and/or send across the internet. However, a low to medium quality MPEG-1 could be under 10 Mb. Even more space and time could be saved if a lower quality MPEG-4 were used which could produce a ten-second video smaller than a megabyte, but this would be at great cost to quality. Certainly the best quality video that could be feasibly stored and transmitted over the internet would be desirable so further information on the Danish National Museum's web capabilities will be needed to determine the ideal video format, but most likely and MPEG-1 or 4 would be used. It is important to understand file size and bandwidth usage when dealing with transmission of data over the internet because if file sizes are too large and too demanding of the available bandwidth, long loading times and slow playback can occur, resulting in an unsatisfactory user experience.

Still imaging is far less complicated than video, but it is important to consider quality and size as higher quality pictures can result in slow up/download times and more user difficulty and low quality pictures can make the images unclear and cause the user to lose interest in the product. As for the video, a webcam could also be used for still imaging and could produce pictures high enough in quality to satisfy and meet the expectations of the user. Again, as in video, the quality of the camera will depend upon the quality of the selected image size and format. When looking at still images one factor important to examine is color depth. This is a measure of the number of different colors a particular image format can use to display a picture.

A GIF (Generalized Interchange Format) file has a color depth of 256 colors, which is sufficient for simple drawn images, but is far too simple to display images of a person without great distortion and over-simplification of the image. JPEG (Joint Photographic Experts Group) formatted pictures are considered by many to be one of the most efficient ways of storing photographic images without the loss of important data that would greatly altar the image being shown. "JPEG exploits the fact that human beings are more sensitive to intensity than to color variations. It can typically achieve 20:1 compression. Very good quality is obtained with compression to roughly 1.5 bits/pixel, so that a color photograph from a 3 Megapixel digital camera is represented by a JPEG file of about 600K bytes." (Weinstein, 2005) A 600K byte picture would be easily up/downloaded over the internet even on a slower internet connection. This easy compression makes JPEG the obvious format to use when storing photographic images for use on the internet.

In order to create the pictures that are used in Flash, Adobe Photoshop 7.0 is an effective program. The program can create complex pictures, combining photographs or eliminating excess background material. Photoshop was used to create nearly every picture in the Virtual Exhibit. The images were cropped and the background was erased, merely leaving the object. This excision allows for the items to be used alongside one another in the final product. A helmet can be placed on a model person, along with clothing and armor. The individual exhibit can look more realistic with the use of this program.

Another hardware concern when developing a tool which can produce Virtual Exhibits is the display device used to allow the user to see and manipulate the multimedia being developed. Old CRT (Cathode Ray Tube) monitors are a thing of the past; they are large, heavy, unclear, and cost not much less than today's flat screen monitors. In the realm of flat screen displays,

however, there are still many options to choose from. The three main types of displays that will be examined will be plasma, LCD (Liquid Crystal Display), and touch-screen monitors. Plasma screens produce a very high quality image at the expense of life of the monitor and much higher prices. Plasmas also tend to exist only in very large sizes. A search on www.newegg.com finds the cheapest plasma screen to be a 42 inch TV that runs around $1200. Clearly, plasma screens are highly unnecessary for the purpose of this project. LCD screens are becoming cheaper and cheaper and produce a crisp image. Another newegg search reveals that a 17 inch flat panel LCD monitor can cost as little as $150. As to the life and quality of these monitors, attention must be paid to reviews and specifications of the particular product, as too cheap a monitor can have quality problems of dead pixels and fading picture over time. Touch-screen technology could add a more interactive and exciting dimension to the project. These types of displays allow a user to literally touch the screen where desired manipulation of the displayed image is desired. Use of touch-screens can completely remove the need for other input devices such as a keyboard or mouse, making the machine simpler and more fun to use. A plastic pen could also be provided so that users could personalize their Virtual Exhibits even further by including adding hand-written script. Price certainly increases when looking at touch-screen versus LCD monitors, but not too significantly when one looks at the money saved through removing other input devices and the increased satisfaction of user experience. A newegg search reveals that a 15 inch touch-screen would run about $450, about three times as much as an LCD. Such decisions will have to wait until further data can be gathered regarding user appeal and provided resources for the project.

Again, all of this information was provided for the proposal of the development of an independent kiosk that could create and send a version of the Virtual Exhibit from the Danish

National Museum itself. The model developed in this project only required that the user have a computer with a browser capable of running Flash 6 or higher.

2.3.3 Internet Multimedia Communication Tools

When looking at ways to send information across the globe, whether it is in the form of text, images, video, or audio, most often the quickest and most efficient way to do this is through the internet. This fact may be clear to most individuals, but what isn't necessarily clear is the most efficient way to encode this information before sending it through the World Wide Web to be then decoded and displayed for the individual receiving it. This section of background investigates the most frequently used coding languages on the internet and their advantages and disadvantages when using them to send different kinds of information, specifically, which would be the best to use in the design of an Virtual Exhibit. The three languages that will be focused upon are HTML, Java, and Flash.

HTML, short for *Hypertext Markup Language*, is the most commonly used language on the internet for encoding web pages. Developed in 1989 by Tim Berners-Lee as the publishing language for the World Wide Web, HTML was based on a system used for "marking up text into structural units such as paragraphs, headings, list items and so on" called SGML or *Standard Generalized Markup Language*. (Ragget, 1998) The goal was to develop a simple way to structure and encode the text in a document to be then sent over the internet and translated by the receiving computer. The *Markup Language* part of HTML refers to a way of writing text while also embedding the format and structure of it in text form. This condenses the amount of information that must be sent over the internet to display a certain set of text in a certain way. The *Hypertext* part of HTML refers to a way of embedding "links" within one document that

send a user to another document with the click of a button. HTML has been further developed over the past seventeen years to its current version, HTML 4.01. Today, it still remains the most effective way of transmitting text information over the internet. HTML, however, does not handle large amounts of video, imagery, or audio very well and thus would not be the ideal language in creating an involved Virtual Exhibit.

Another internet language, which is much better at handling large amounts of multimedia, is Java. Java was first developed independently of the internet in 1991 as a language to be implemented in "'smart' consumer electronic devices that could all be centrally controlled and programmed from a handheld-remote-control-like device." (Abrams, 1998) A member of this team of developers, James Gosling, was responsible for developing the language to be used. He based it on C++ and developed what many would argue is the way C++ should be. (Abrams, 1998) The project proved to be unsuccessful and Java became a language without a home until 1994 when Bill Joy, president of Sun Microsystems, found it was an ideal language for use on the internet. (Abrams, 1998) Java's three main advantages over existing internet languages were its "platform independence, security, and reliability." (Abrams, 1998) Java's biggest advantage is its simplicity; it is among the simplest internet languages while still maintaining flexibility and capability. For this project, however, raw programming was bypassed fro the most part through use of third party programming programs. It was more important to use a language that can easily handle a wide variety of multimedia and is easily accessible to the majority of people. Flash meets these criteria.

Flash was born in 1996 when Macromedia and Disney got together and commissioned Jonathan Gay and associates to further develop their Java based animation program FutureSplash. (Gay) Now owned by Adobe, Flash is capable of loading and playing animation,

audio, and streaming video much better than what HTML or Java is capable of. Flash is superior in the realm of multimedia to HTML and Java for three main reasons: "Flash movies load faster and save on download time because Flash is vector based whereas HTML is not. Flash intelligently 'caches' it's movies so they don't have to be reloaded. Flash gives the user (the person viewing/using the Flash movie) a more responsive 'rich-client' like experience." (Mischook) Flash is hands down the way to encode multimedia rich material on the web and for the purpose of this project audio, video, and image data was used heavily, hence Adobe Flash was the language used on this project.

When developing a project in Flash, there are four main components to the design interface: the Stage, the Timeline, the Library, and ActionScript. The Stage, which is where all visible content is displayed, is essentially where the project comes to life. The Timeline is where one can describe what happens to content and when and where it occurs. The Timeline is also where the layering of content is controlled. The Library is where all the content of a particular project is stored, allowing for easy access to any media needed in the project. The final component to designing media in Flash is ActionScript.

ActionScript is the language or "script" that Flash 8 uses to program various commands, events, and interactions. The current version of Flash uses ActionScript 2.0. ActionScript uses what is called object-oriented programming, or OOP. The OOP features in ActionScript 2.0 are loosely based on the ECMAScript 4 Draft Proposal. (Adobe, 2005) The object-oriented programming is ideal for Flash applications, particularly for the development of the Virtual Exhibit, because it allows for much easier handling of numerous "objects" such as video clips, animations, pictures, and other multimedia within the script. The following is an ActionScript excerpt from and Adobe Flash tutorial on writing ActionScript. This particular command causes

an animation to become visible when a particular button is pressed. The "this" tells ActionScript that an object is going to be referred to, in this case "onButton_btn." The "onRelease" is a command that refers to the mouse command of releasing a click on the specified button. A condition is now set up. The result is a function that sets the object "screen_mc" to be visible. Hence, one can see how the OOP greatly simplifies encoding. Flash 8 provides many tools to simplify the coding process. There is Script Assist mode, which walks one through the writing of a command through the use of menu items and check boxes. There is also a library of commands provided so one does not need to memorize all the code or refer to a book. Flash also provides menu accessible ways of writing ActionScript. The "Behaviors" menu provides an assisted way of applying ActionScript to individual objects. The "Components" menu creates various objects that would have to be otherwise created through more complex ActionScript encoding using simpler objects. Thus, Flash 8 provides a high level of user friendliness and one does not need a degree in computer science to create complex and visually stunning content.

```
// function to show animation
this.onButton_btn.onRelease = function(){
    screen_mc._visible = true;
};
```

3. Methodology

This section explains the steps that we have taken in order to develop our idea and implement it effectively. Targeted concepts include design aspects, context of the Virtual Exhibit, programming and hardware descriptions as well as a layout of how the group will spend its time in Copenhagen. A survey was created to examine the effectiveness of the proposed design for the project. All time schedules and plans were subject to change as the plan evolved to meet the needs and wants of our sponsor.

3.1 Preliminary Virtual Exhibit Design Ideas

The first step to be executed in the development of a Virtual Exhibit for the Danish National Museum was the development of preliminary ideas in the layout and design of the Virtual Exhibit. The five main aspects to be investigated were as follows: the personal context of the exhibit, which entailed an investigation as to how the sender of the Virtual Exhibit could include personalized items into the exhibit; the museum context of the exhibit, which pertained to how elements of the Danish National Museum would be included in the exhibit; integration, which looked at how the personal and museum elements of the exhibit could be combined; programming, which looked at how to encode the Virtual Exhibit using a computer; and lastly a look at the hardware that would be necessary in the creation of the Virtual Exhibit.

3.1.1 Context

Looking at how the personal context of the exhibit was generated, there were a wide variety of pictures for the user to choose. The ability to personalize their individual exhibits with a specific title and different images of their choosing provided a wide array of customization and added a level of individualization that could not be achieved with a pre-made one or with a simple picture. Personalization could also include a recoded audio message. This message could range in complexity from a simple greeting to telling stories about the selected exhibit and what each object is famous for.

The museum context of the exhibit mainly included media from two possible sources: the museum archives and the current exhibits displayed in the museum. More information was obtained with regard to the quality and extent of material available from the museum archives

before a decision could be made pertaining to where the majority of museum media will be acquired. One suggestion that may be an improvement to the exhibit in the future utilizes the museums current audio tour and allows the creator of the postcard or Virtual Exhibit to send an image of a particular exhibit with the option of including a sound byte from the audio tour explaining the exhibit. In general, decisions on how to implement museum context were based on resources available from the museum and the initial survey data gathered.

3.1.2 Programming

The programming and encoding of the digital Virtual Exhibit was already investigated in the earlier background section and it was decided that Adobe Flash would be the ideal way to assemble the Virtual Exhibit. Hence, extensive time has been dedicated to studying and learning how to use Adobe Flash 8. Numerous tutorials provided by Adobe with the Flash 8 program have been completed by all project members in an effort to gain familiarity with the language that will be the basis of the project. Other tutorials from various web sources have also been completed in an effort to understand specific commands and techniques that may prove useful in the development of the final Virtual Exhibit. Tutorials completed by various project members include:

From Adobe:
- Basic Tasks: Create a Document
- Basic Tasks: Create an Application
- Basic Tasks: Create Symbols and Instances
- Basic Tasks: Add Button Animation
- Creating Graphics: Making Animations with Easing
- Creating Graphics: Applying Gradients
- ActionScript: Add Interactivity
- ActionScript: Create a Form with Conditional Logic and Send Data
- ActionScript: Use Script Assist mode
- ActionScript: Write Scripts

From other sources:

Realistic Ball Movement:
http://www.actionscript.org/resources/articles/562/1/Realistic-ball-movement/Page1.html
Code Snippets, Drag:
http://www.dreamincode.net/code/snippet143.htm

3.1.3 Hardware

The hardware needed for the project was also previously investigated in the background section. For the development of the internet-based Virtual Exhibit, which can be accessed externally from the Danish National Museum, no extra on site hardware will be required. The application can be created with provided laptop computers and stored and implemented using the museum's existing server and website. Individuals who wish to use the Virtual Exhibit will need a computer with internet access and a browser that supports Flash 6 or later. More hardware will be necessary, however, for the museum kiosk proposal. For the capture of an image and audio sample a webcam (quality depending of resources) and simple microphone (cheap enough resources hardly factor in) can be used. The most concern with respect to hardware for the project lies in the design of the Virtual Exhibit station. The Virtual Exhibit station could range from a desktop computer the individual uses to create and send the exhibit to a large kiosk that would be as automated as possible to increase user friendliness. Again, budget will play the biggest role in making this decision, but data obtained from surveying will also be used to determine how comfortable and capable the Virtual Exhibit demographic is with computers and technology. The development and implementation of these surveys will be investigated in the next section.

3.2 Project Foundation

The goal of our project was to create a new online application that can be used in conjunction with the Current Danish National Museum website (located at www.nationalmuseet.dk) which visitors can customize with different pictures and descriptions of artifacts from within the museum. We had two ideas for the means by which the visitor can customize and save their Virtual Exhibit. Both ideas incorporated the concepts of personalization and customization so that the visitor actually felt like their own Virtual Exhibit was representative of themselves.

The first idea that we worked with involved the use of an empty display case and a group of artifacts. The visitor could either create exhibits based on time, theme, interest, or even subject (one example was creating an exhibit of different weapons from different ages). As they create the exhibit, an information box would appear below the object describing what time period it was from, and other general information about it. At the completion of their project, the visitor would have the option of saving their exhibit and emailing it to a friend or posting it in some sort of online gallery.

The other idea that we preliminarily investigated was the concept of having a customizable character, or "avatar," which allows the user to be able to dress it in certain articles of clothing and other objects from the museum. As in the previous example, an information box would describe the items that they were choosing, and they would also be able to save the character so that others might be able to view it.

The great aspect of doing this project entirely in Flash 8 and then hosting it on the internet was that there would be close to no cost incurred by the museum itself. The only potential cost was that of the hosting the page on their website, which would cost next to nothing

if they already have a web hosting service. We have also included price estimates in Appendix C if the museum would like to pursue some sort of E-Kiosk where people could create their own exhibits while they were actually in the museum. This stationary project center could add another level of personalization if they included pictures of themselves, perhaps making the head of their avatar a picture of their own head.

3.3 Surveying

During this project, there was one survey to evaluate young adult interest in the museum. Rather than handing out a paper form of the survey within the museum, it was decided that an online survey would be more effective. Created by Create Survey, the online version was sent to a group of educators who receive a weekly museum newsletter and will assess the interest and effectiveness of an online Virtual Exhibit. Sending the survey to this group eliminated the difficult task of finding and emailing actual youthful potential museum utilizers in Copenhagen.

3.3.1 Details of the Survey

The survey addressed many questions that aided in the design of the Virtual Exhibit. The questions asked dealt with the demographics of individuals as well as which exhibits were most popular. An example of the survey is shown below. The initial survey was altered so more information could be gathered, pertaining to the museum and the offered exhibits. The revised survey was comprised of fewer questions and more easily ascertained which exhibit generated the most interest.

The new survey was distributed to educated individuals who had previously expressed interest in museums and their collections. Charlotte Jensen sent the survey out to a group of her

colleagues in newsletter format. Although the survey shown below is in English, the version included in the newsletter was translated into Danish.

3.3.2 Virtual Exhibit Survey

1. **Age**
   - ☐ <14
   - ☐ 14-19
   - ☐ 20-25
   - ☐ 26-30
   - ☐ 31-35
   - ☐ >35

2. **Gender**
   - ☐ Male
   - ☐ Female

3. **Are you a member of the Museum Club?**
   - ☐ Yes
   - ☐ No

4. **Do you have the means to easily record audio with your computer?**
   - ☐ Yes
   - ☐ No

5. **Your favorite exhibitions at the Danish National Museum include:**
   - ☐ Prehistory
   - ☐ Classical and Near Eastern Antiquities
   - ☐ Middle Ages and Renaissance
   - ☐ Modern Danish History
   - ☐ People of the World
   - ☐ Royal Coin Collection
   - ☐ Children's Museum
   - ☐ Other _____

6. **Your areas of interest include:**
   - ☐ Weapons and Armor
   - ☐ Death
   - ☐ Jewelry
   - ☐ Clothing
   - ☐ Design (Furniture/Architecture)
   - ☐ Punishment
   - ☐ Religion
   - ☐ Romance
   - ☐ Other _____

7. **In an online exhibition would you like to see:**
   - ☐ Pictures of Artifacts
   - ☐ Descriptions of Artifacts
   - ☐ General Historical Information

8. **On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a customizable character that could be dressed with clothing and equipment from various historical periods?**

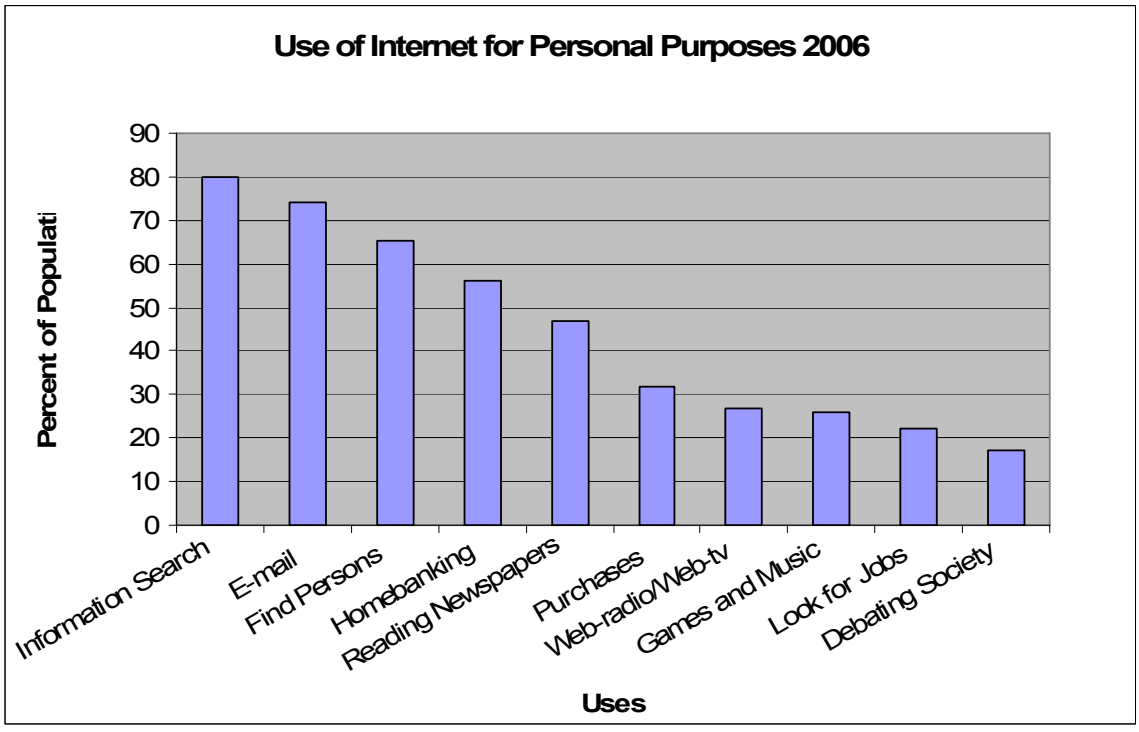
9. **On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a custom online exhibition that others could view?**

10. **If you created a custom exhibit on the Danish National Museum's website, would you want to send it to friends and family?**
    - ☐ Yes
    - ☐ No

3.3.3 Development of an Virtual Exhibit

The interactive Virtual Exhibit was dependent on young adult interest and usage. The Virtual Exhibit combined the attraction to the internet with an incentive to interact with the multimedia available. Using programs such as Macromedia Flash 8 and Adobe Photoshop 7.0, an online component was developed to peak the interest of visitors.

According to *Denmark in Figures 2007*, Danes were comfortable using e-mail and the internet. Eighty-three percent of Danish citizens had access to the internet at home. The internet serves many purposes, but it was mainly used for searching information and email. (Denmark in Figures)



Graph 5: Use of the Internet for Personal Purposes 2006 (Denmark in Figures)

3.4 Creating the Virtual Exhibit: Schedule

The first week was mainly spent at the National Museum. Meetings with the curator of the children's museum, director of the museum club and a tour took place during the beginning of the week. We also spent time familiarizing ourselves with Flash 8 and worked through tutorials that came with the program.

During the second week, the survey was completed and translated from English to Danish. The survey was then posted on createsurvey.com and revised to produce the best results. Flash tutorials continued to be used to learn more about the program and initial ideas for the Virtual Exhibit were proposed. Photographs of museum exhibits were edited so they could be used in the Virtual Exhibit.

The survey was sent out in Charlotte Jensen's newsletter during week three of the project. We created our conceptual design of the Virtual Exhibit and defined the design concept to better fit the needs of the visitors to the museum. We discussed the proposed idea with our sponsors and compared it to the survey data to make any necessary changes. We created a prototype from these plans.

During week four, we continued to redesign the Virtual Exhibit and worked on assessing the survey data. The survey had 104 responses that were examined and used in data collection. The prototype was further developed to include two exhibit areas that can be used to exhibit a personal collection of objects. Two pre-made exhibits were added into the Virtual Exhibit.

Week five, we completed the design of the customizable Virtual Exhibit and worked on finding a way to save the exhibit to the internet so it would be shared with others. Descriptions for the pictures were created and given to Charlotte Jensen to translate into Danish. We learned

to create dynamic customizable content for the exhibit and developed ways to insert the descriptions.

Week six was spent further updating the Virtual Exhibit to accommodate the needs of the museum. The paper was further developed and the results and conclusions were being developed. Charlotte was translating the descriptions so they could be added into the final Virtual Exhibit.

The final week was dedicated to finalizing the paper and preparing for the final presentation. The Virtual Exhibit was completed and made accessible to the museum. A copy of the project was given to the museum for their personal use. The presentation was held at the Danish National Museum for interested museum staff and Charlotte's colleagues, along with other interested individuals.

Throughout the entire project, we continually updated our project report and presentation so that it would be ready to present to our sponsors and advisor at the completion of the term. Table 1 below provides a visual description of the project's progression. The rewriting and redeveloping we performed on the project is shown throughout the report.

3.5 Methodology Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
		MARCH		
19 DNM Orientation	20 DNM Orientation/Tour	21 DNM Orientation/MIK	22 Intro to Flash/Work on Survey	**23** **Finish Survey** More Flash Tutorials
26 Flash Tutorials Team Assessment	27 Flash Tutorials Preliminary Design **Meeting with Charlotte Evaluation**	28 Background and Methodology Writing	29 Background and Methodology Writing	**30** **Background and Methodology**

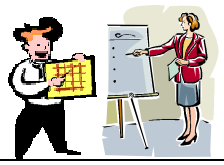
		APRIL		
2 Analyze Survey Data More Design Concepts **Meeting with JZ, RV and Charlotte**	3 Start Creating Prototype Application	4 Continue Initial Design of Prototype **Newsletter Sent out with Survey**	**5** **EASTER** 	**6** **EASTER** 
9 **EASTER** 	10 Working on Prototype Exhibit Update Paper	11 Working on Prototype Exhibit Update Paper	12 Working on Prototype Exhibit Update Paper	**13** **Presentable Prototype Final Background Preliminary Results** **Meeting with Charlotte**
16 • Compile and Translate Descriptions of Photographs • Continue Updating Virtual Exhibit • Learning to Create Dynamic Customizable Content for Virtual Exhibit • Start Creating Customizable Virtual Exhibit • Revising the Paper	17	18	19	**20** **Final Results, Preliminary Analysis, Conclusions and Recommendations** **Meeting with Charlotte**
23 • Updating the Current Virtual Exhibit • Inserting Descriptions into the Virtual Exhibit • Revising the Paper and Presentation	24	25	26	**27** **Final Analysis, Conclusions and Recommendations** **Meeting with Charlotte**
		MAY		
30 • Finishing the Virtual Exhibit • Finishing the Paper • Finishing the Presentation	1	2 **Meeting with Charlotte**	3	**4** **Final Report Due**
7	**8** **Presentation** 	9		

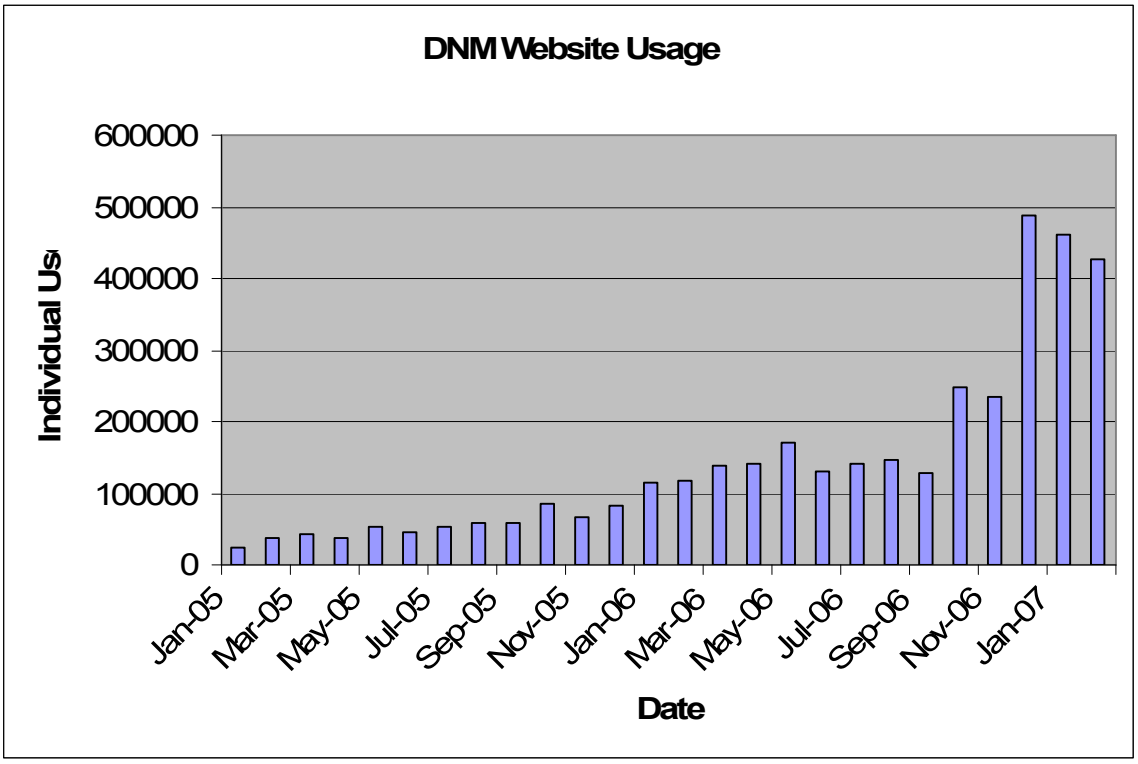
Table 1: Project Calendar

4. Results and Analysis

In the preliminary design and ongoing redevelopment of our Virtual Exhibit, the group had to take into account a wide variety of information made available to us through public surveys, team surveys, recommendations from our sponsor, and personal preference and taste. In using all of these aspects, we were able to create an online exhibit that would appeal to a wide range of individuals instead of just the history entrepreneur. Included in this section are results from surveys taken and the teams' design progression of the Virtual Exhibit.

4.1 Museum Website Survey

The National Museum conducted their own survey using a program on their website in order to learn the age, location, gender, and interests of a regular website visitor. Our project would eventually be featured on the museum website, so we felt it was an adequate course of action to pursue the results of this survey and combine them with our own to better understand the interests and classifications of the Danish public. The Museum had also been tracking the usage of their website for the last few years; a graph of the website usage is included below.



Graph 6: Danish National Museum Website Usage (Danish National Museum)

This graph demonstrated the large growth of website usage since 2006. The number of individuals using the web site had more than doubled since October 2006 specifically. This large spike in website usage could be attributed to a couple of factors. The first and most obvious would be that the museum was becoming more popular because of the free attendance; the rise in actual attendance to the museum would seem to support this claim. Another factor that may have contributed to the rise was the fact that online users were visiting the museum gift shop's website and looking for Christmas presents to buy their loved ones. The last factor that may have played a key role in this rise was the fact that the museum has had a very successful series of special exhibits since this time, all very well received by the Danish public. These special exhibits include an assortment of antiquity, cultural history, prehistory, medieval, and ethnological exhibits; the current exhibit at the time of this study was a special look into Tycho Brahes Verden's life. Specifically, the medieval and prehistory exhibits were especially well

received by the public, showing that over 50 percent of total visitors expressed interest in these topics. The overall increase in museum website usage only furthers the need for some sort of online exhibit where people could learn what's inside the museum; this would spark their interest and encourage them to visit in person.

The second part of the Museum's survey consisted of 16 questions and ratings designed to get an image of the general web site user and how they felt about the website's layout. There were a few key figures that we felt were worth mentioning in this section. The first was that 60% of the visitors to the website were female. This figure alone could have completely changed the design concept for the Virtual Exhibit. If the number had been 60-70% men then the exhibit may have included more guns, weapons, war history and things of that nature. As 60% of the visitors were women, we decided to include some more feminine interests into the Virtual Exhibit such as dresses, pottery, golden objects and paintings. These objects, combined with weaponry and punishment items, create an assortment of objects described in Appendix F. Ultimately, the project team, in consultation with the Communication Department, elected to create three specific Virtual Exhibits on the following themes: War and Punishment; Religion and Society; Wealth and Fashion.

Another key factor we looked at in the survey was the age of the visitor. Roughly 45% of the visitors fell within our target age group, telling us that the website was an effective way to reach our target audience. By utilizing the website to spread our Virtual Exhibit to the current website users, it will attract more of our target audience to the museum website.

To our surprise, over 50% of the visitors to the museum website were actually located in Copenhagen and Frederiksberg. This fact is interesting because we would have believed the website to be used by either tourists or other native Danes from different districts who were

planning a trip to the museum. Since most of the website users were coming from Copenhagen, we chose to create exhibits for individuals who were more interested in new and temporary exhibits rather than basic museum information and static exhibits.

One thing in particular of importance to our project was a question about how quickly the pages loaded on the website. Out of everyone surveyed, 91% of individuals said that the page loaded fast enough for their needs, which means that if we wanted people to use our Virtual Exhibit, the page should load in approximately the same amount of time that it takes for the museum web page to load. This option could also be explored further with an interactive survey at the museum.

4.2 DNM Electronic Survey

In order to find out what the most popular and interesting themes in the museum were, we decided to create a survey which would ask questions about the age, location, interests and computer knowledge of potential users. Originally, we had planned on using a paper survey at the museum and would hand it out to willing visitors near the exit. A preliminary survey was developed but was eventually revised once we obtained information from previous museum surveys. An example of the preliminary survey is included in Appendix D.

Our sponsor suggested that instead of handing out paper surveys, we could use a newsletter that she sends out to history enthusiasts and put in a link to an electronic survey. By using the newsletter, it was easier to analyze the data since it was compiled automatically on the website. We used the website www.createsurvey.com in order to put the survey online, and used its summary feature to have graphs of the data instantly generated for us to use. Below is a

summary of the results in raw data format. Appendix E includes data analyzing the results cross tabulated with the age and gender of those surveyed.

4.2.1 Survey Raw Data

Alder (Age)	
<14	0 (0.00%)
14-19	0 (0.00%)
20-25	6 (5.88%)
26-30	9 (8.82%)
31-35	7 (6.86%)
>35	80 (78.43%)

Køn (Gender)	
Mand	50 (49.02%)
Kvinde	52 (50.98%)

Er du medlem af museumsklubben? (Are You A Member of the Museum Club?)	
Ja	12 (11.76%)
Nej	90 (88.24%)

Har du nem adgang til at optage lyd på din PC? (Can you easily record audio on your computer?)	
Ja	78 (76.47%)
Nej	24 (23.53%)

Hvilke udstillinger på Nationalmuseet synes du bedst om: (Areas Of Interest)	
Danmarks Oldtid	57 (55.88%)
Antiksamlingen	18 (17.65%)
Middelalder og Renæssance	55 (53.92%)
Danmarkshistorier (Danmark 1660-2000)	56 (54.90%)
Jordens Folk (Etnografisk Samling)	30 (29.41%)
Den kgl. Mønt- og Medailjesamling	10 (9.80%)
Børnenes Museum	12 (11.76%)
Andet	7 (6.86%)

Hvilke emner synes du er spændende: (Topics of Interest)	
Våben og rustninger	39 (38.24%)
Død og begravelse	45 (44.12%)
Smykker, skatte	48 (47.06%)
Tøj – moden gennem tiderne	44 (43.14%)
Design (møbler/arkitektur)	35 (34.31%)
Forbrydelse og straf	47 (46.08%)
Religion, tro og overtro	69 (67.65%)
Romantik - kærlighed	23 (22.55%)
Andet	14 (13.73%)

I en webudstilling vil jeg gerne se: (What would you like to see in an online exhibit?)	
Billeder af genstande	80 (78.43%)
Beskrivelser af genstande	68 (66.67%)
Historisk information	90 (88.24%)

På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du da være I at lave en figur, som kan klædes på med tøj, og udstyr fra forskellige perioder?		
1	35 (34.31%)	On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a customizable character that could be dressed with clothing and equipment from various historical periods?
2	15 (14.71%)	
3	15 (14.71%)	
4	17 (16.67%)	
5	20 (19.61%)	

På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du være i at lave en webudstilling som andre kunne se?		
1	43 (42.16%)	On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a custom online exhibition that others could view?
2	12 (11.76%)	
3	14 (13.73%)	
4	12 (11.76%)	
5	21 (20.59%)	

Hvis you lavede en din egen udstilling på Nationalmuseets hjemmeside, ville du da have lyst til at sende den til familie og venner? (Would you send this to friends and family?)	
Ja	88 (86.27%)
Nej	14 (13.73%)

Table 2: Project Survey Results

Unfortunately, most of the responses we got to our survey were from people outside our age group. Only about 22% of the responses were between the ages of 14-35. The rest of the responses were from an older age group. While this was a disappointment, it didn't completely rule out the data that was gathered through the survey.

We did learn some very interesting things that helped us in the creation and development of the Virtual Exhibit. One example of such data is that fact that 86% of those surveyed said they would indeed send their own personalized exhibit to their friends and family; this statistic was very encouraging to the project. Another important piece of information was that 76% of those surveyed said they did indeed have the means to record audio messages with their computer. This means that if we wanted to include some sort of audio message within the exhibit it would be possible for most users to do this.

In terms of areas of interest there was a large spread over the various categories which included weapons and armor, death, jewelry, clothing, design, religion, punishment, and romance. These themes were created based upon information given to us by Charlotte Jensen, the survey, and our own observations on the interests of today's teenagers. This breadth of interest suggested that we have to incorporate a wide variety of objects for the user to be able to manipulate and position within the exhibit.

4.2.2 Survey Cross Tabulation

The online survey program used to create the survey for the project allowed for further analysis of the results with cross tabulations. Below are some of the more useful results, stating how age and gender differences compare to the raw data.

The first graph looks at the online exhibition items vs. the ages of the individuals surveyed. Overall, the public is interested in learning about general historical information. It is beneficial to include photographs in the project, but the public expressed a greater interest in the descriptions of artifacts. The combination of the two should provoke great interest in the museum since it includes a variety of visual information exploring the past. The age cohort 20-25 shows the most useful results because the younger age group expressed the most interest in information accessed online.

I en webudstilling vil jeg gerne se: (In an online exhibition, would you like to see:)	<14	14-19	20-25	26-30	31-35	>35
Billeder af genstande (Pictures of Artifacts)	0.00% 0 of 1	0.00% 0 of 1	83.33% 5 of 6	66.67% 6 of 9	85.71% 6 of 7	78.05% 64 of 82
Beskrivelser af genstande (Descriptions of Artifacts)	0.00% 0 of 1	0.00% 0 of 1	100.00% 6 of 6	77.78% 7 of 9	71.43% 5 of 7	62.20% 51 of 82
Historisk information (General Historical Information)	0.00% 0 of 1	0.00% 0 of 1	100.00% 6 of 6	88.89% 8 of 9	100.00% 7 of 7	86.59% 71 of 82

Table 3: Cross Tabulation - Age and Interests

The second graph analyzes the interest in sending a customized exhibit to friends and family. With all of the results showing an interest of greater than 80%, it can be seen that the ability to communicate interest in a museum online is a priority. The ability to transmit data online is a resource that would be of great interest to museum visitors of all ages. The internet is a valuable tool that should be utilized for the completion of the project.

Hvis you lavede en din egen udstilling på Nationalmuseets hjemmeside, ville du da have lyst til at sende den til familie og venner? (If you created a custom exhibition on the Danish National Museum's website, would you want to send it to friends and family?)	<14	14-19	20-25	26-30	31-35	>35
Ja (Yes)	0.00% 0 of 1	0.00% 0 of 1	83.33% 5 of 6	100.00% 9 of 9	85.71% 6 of 7	85.37% 70 of 82
Nej (No)	0.00% 0 of 1	0.00% 0 of 1	16.67% 1 of 6	0.00% 0 of 9	14.29% 1 of 7	14.63% 12 of 82

Table 4: Cross Tabulation - Age and Communication

The third graph describes the areas of interest compared to the gender of an individual. Overall, the women prefer interests such as death, jewelry, clothing, furniture and architecture, religion, and romance. The men had positive reactions to the topics of weapons and armor, religion and punishment. The areas that showed the greatest interest for both genders were religion, death, and jewelry. These interests should be incorporated into the Virtual Exhibit in order to cater to the consumer.

Hvilke emner synes du er spændende: (Your areas of interest include:)	Mand	Kvinde
Våben og rustninger (Weapons and Armor)	49.02% 25 of 51	26.42% 14 of 53

Død og begravelse (Death)	**41.18**%  21 of 51	**47.17**%  25 of 53
Smykker, skate (Jewelry)	**37.25**%  19 of 51	**54.72**%  29 of 53
Tøj – moden gennem tiderne (Clothing)	**13.73**%  7 of 51	**71.70**%  38 of 53
Design (møbler/arkitektur) (Furniture/Architecture)	**25.49**%  13 of 51	**43.40**%  23 of 53
Forbrydelse og straf (Punishment)	**49.02**%  25 of 51	**43.40**%  23 of 53
Religion, tro og overtro (Religion)	**60.78**%  31 of 51	**73.58**%  39 of 53
Romantik – kærlighed (Romance)	**11.76**%  6 of 51	**33.96**%  18 of 53
Andet (Other)	**7.84**%  4 of 51	**20.75**%  11 of 53

Table 5: Cross Tabulation - Gender and Interests

The final graph considers the interest individuals' had in personally creating the online exhibit. According to the results, women were more likely to create the exhibit than men. An interesting comparison is the creation graph vs. the emailing graph. Many individuals are interested in sending the online exhibit while a high percentage of individuals show little interest in the creation of the Virtual Exhibit. This decrease in interest could express a lack of time for the consumer to create the product.

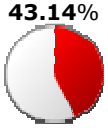
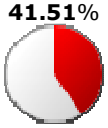
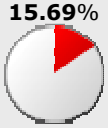
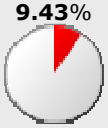
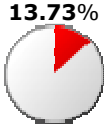
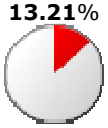
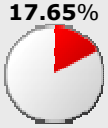
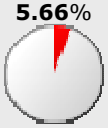
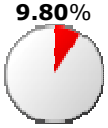
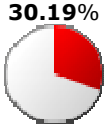
På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du være i at lave en webudstilling som andre kunne se? **(On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a custom online exhibition that others could view?)**	**Mand**	**Kvinde**
1	**43.14%**  22 of 51	**41.51%**  22 of 53
2	**15.69%**  8 of 51	**9.43%**  5 of 53
3	**13.73%**  7 of 51	**13.21%**  7 of 53
4	**17.65%**  9 of 51	**5.66%**  3 of 53
5	**9.80%**  5 of 51	**30.19%**  16 of 53

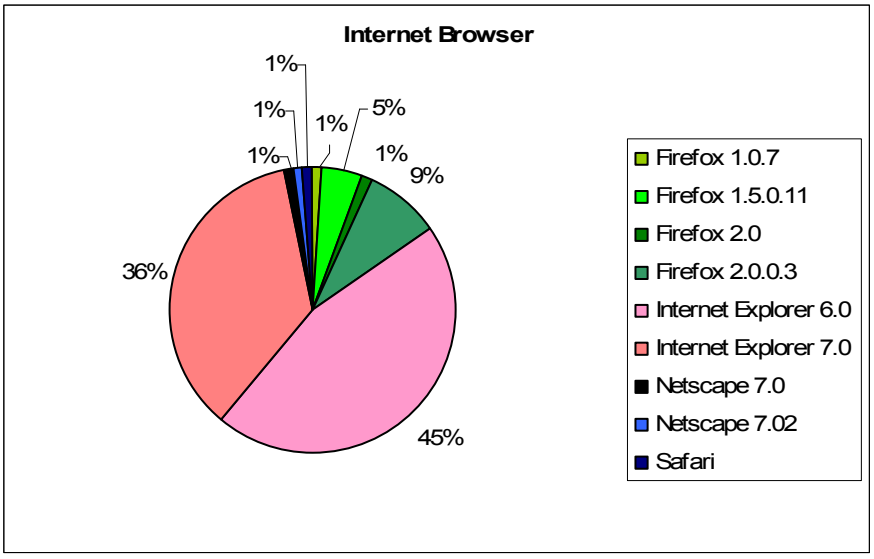
Table 6: Cross Tabulation - Gender and Creation of a Virtual Exhibit

4.2.3 Browser Considerations

It is integral to our project that the average user can easily download the Flash application to interact with the Virtual Exhibit. The survey posted for our project collected browser information from the survey responses. A complete table of the data is included in Appendix E as Survey Analysis of Computer Capabilities. Graphs below depict statistics useful for the project

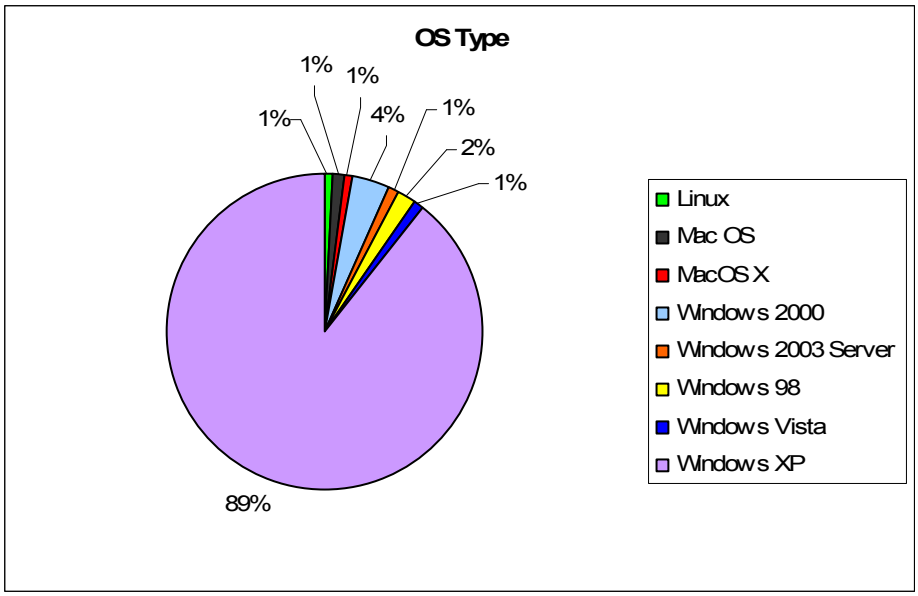
The four main web browsers used are Internet Explorer, Firefox, Netscape and Safari. The percentages of users for the main browsers are shown here, with detailed descriptions shown in the graph below. All the versions of Firefox, Netscape and the Internet Explorer are all capable of supporting the Adobe Flash program, so it is a perfectly reasonable conclusion to estimate the total user Flash capability at around 99%.

Internet Explorer	**81%**
Firefox	**16%**
Netscape	**2%**
Safari	**1%**



Graph 7: Internet Browser Data Gathered from the Survey

According to Shockwave.com, Windows, Macintosh, Intel-based Macs, Linux, Solaris, and Pocket PCs can download the necessary web browser software necessary to view the interactive Virtual Exhibit. This information leads us to believe that the public will have no problems with the download for the program. The browsers listed above would incorporate all of the operating systems shown below, allowing for easy access the website. It would be useful for the visitors to have the most current version of the browser if they would prefer faster downloads and better graphics.



Graph 8: OS Type Data Gathered from the Survey

4.3 Design Progression

Originally, the design for the Virtual Exhibit was going to be an "E-Postcard" containing a picture or a scene from the museum that could be customized with text, audio, images or even video. After the completion of the postcard, the visitor could send the final product to their family and friends, encouraging others to visit the museum.

Since the initial presentation of our idea, the concept of it has changed dramatically. It continues to be an online application with the ability to manipulate text, images, and possibly even audio. However, it was decided that even more personalization and customization was required. It was at this point that we decided that we would go with the Virtual Exhibit idea, where visitors would be able to create their own exhibits using objects from the museum in order to send them to friends and family.

The original concept of the Virtual Exhibit was that there would be a blank mannequin in the center of the screen with museum objects on both sides. You would then be able to "dress" the mannequin with certain items from the museum. Such dressing can be accomplished with a simple drag and drop code in action script which is given below. This simple piece of code allows the user to customize the look and presentation of their mannequin.

```
1 on (press) {
2       startDrag (sword);
3 }
4 on (release) {
5       stopDrag ();
6 }
```

Figure 2: Example of Code used in Flash 8

We experimented with the mannequin idea for a while, but the photographs of clothing were shot from different angles; to turn two dimensional photographs into three dimensions without new pictures being taken was an impossible task. Perhaps if we had access to different photographs or were able to take new ones specifically designed for the mannequin, the necessary angles could be included within the shots.

Our final design includes two blank museum display cases with a wall in-between where larger items can be included. The user would be able to drag and drop items into the display cases, and when they scroll over them with the mouse a little dialogue box will be displayed telling the user what the object is and its significance in Danish history. The interface will work kind of like a window, where the user will be able to scroll back and forth between the two display cases and will also be able to view the whole thing if they want to. Below is an image of what the project currently looks like.

Figure 3: Project Online Layout

4.4 Exhibit Creation Procedures

The first thing we tasked ourselves with when we created the exhibit was to create some sort of navigation panel so that different exhibits could be selected and the user could easily view them with a single click. In order to achieve this, a scene was created with 6 different drop-down windows, which animated upon entering the scene. A screenshot of each exhibit was then faded into the scene over those windows for selection by the user. As the user's mouse rolled over each window a glow was added in front of the picture to enhance interactivity and overall design. Later on the museum logo and our own Virtual Exhibit logo were added in the corners of the scene. This first screen served as our initial navigation window, until a new one was created later on.

Our next step involved creating the actual sample exhibits for the user to view. The most challenging part of this step was obtaining pictures of blank display cases. Several trips were made to the museum and many pictures were taken of either blank display cases in the museum itself, or toy cases in the children's museum. Unfortunately, due to the nature of the museum being a public visiting place we were not able to properly set up for factors such as glare and Flash reflection in our pictures. As a result the pictures that were taken could not be used and alternative means were required.

Eventually the team resorted to doing an image search on Google (http://www.google.com) for "Blank Display Case" and an image was returned that we felt we could work with. Originally the case was populated with several objects, however using Adobe Photoshop we were able to cut these images out and also add a second case so that user could scroll back and forth between them. The original image and photo-shopped image are included below.

Figure 4: Original Photograph of an Exhibit

Figure 5: Virtual Exhibit Final Layout

After we created this image to be used as the background we needed to import as many pictures that we could into the Flash library for use. We obtained these pictures from Charlotte Jensen using the museum archives, and were able to incorporate them into the exhibit. Once again we used Photoshop to cut out the white around the images so that the exhibit would show as the background. Examples of the photos along with descriptions are included in Appendix F. Using these photos, along with a filter included in Flash called "Drop Shadow," we were able to create three-dimensional looking objects on a two-dimensional plane.

In order to properly view the exhibit we decided to make one case take up the entire screen, with scrolling buttons on each side so that the user we be able to see each item closer and in more depth. In order to create a scrolling button we used the code below to create variables

based on the selection of the button and the x and y locations of the display case image. This made it possible to control the borders of the scrolling function based on a coordinate system.

```
stop();
var pan:Number = 0;
var forward:Number = 0;
onEnterFrame = function () {
    scrollright();
    scrollleft();};
this.left_btn.onPress = function() {
    pan = 1;};
this.left_btn.onRelease = function() {
    pan = 0;};
this.left_btn.onReleaseOutside = function() {
    pan = 0;};
this.right_btn.onPress = function() {
    pan = 2;};
this.right_btn.onRelease = function() {
    pan = 0;};
this.right_btn.onReleaseOutside = function() {
    pan = 0;};
function scrollright() {
    if (display_mc._x<=855 and pan == 1) {
        display_mc._x += 3;
        plaque_mc._x += 3;
        skull_mc._x += 3;
```

Figure 6: Example of Virtual Exhibit Code

The final pieces that we included within the pre-made exhibits were little customizable plaques that could be placed in front of each case or even on the walls to label sections of the exhibit, and information boxes that would appear when the user scroll over each object with the mouse. Once these final objects were in place the pre-made exhibits were ready to be viewed.

The process of creating the customizable Virtual Exhibit was a long and frustrating one. In order to create the necessary level of customization there was a great deal of code that needed to be written for each object. A complete summary of all the code used in the customizable

scene is included in Appendix G. Simply glancing over the vast amount of code one can plainly see that this is not a process that can easily be undertaken in a week or so. Besides having to write all this code we had to take the time to discover how each string functioned and what the parameters were. Multiple versions were created and tested until the final design was decided upon.

We started out using the same background and objects that we had used in the pre-made exhibits. The first challenge that presented itself was to make an interface with which the user could interact with in selecting what object the wished to place in the exhibit. We eventually decided to keep the design of a clear window from the previous scenes. We created a movie clip which had a different object in each frame and arrows to scroll in between them. We originally felt that it would have been a good idea to insert each object as the user clicked on them. This however proved difficult due to the fact that the objects were imbedded in a different layer. Eventually, we decided to just use an insert object button in the original movie to create the objects. The objects were created based on what frame the navigation panel currently on, thus we were able to work around the problem of embedding a button into a sub movie of the main file.

The next issue arose when we tried to add the script to drag the objects around the main screen. It proved very complicated to add the correct script to items that were created on the fly by the user. We worked around this problem by initially placing all of the selectable objects in the exhibit display. Actionscript has a function called visibility which sets the visibility of any object on the screen. Using this script we initially set all of the objects to invisible, then depending on what frame the navigation panel was in the objects could be set to visible and moved to the center of the screen by clicking the insert object button. A simple click and drag

script was also added so that the objects could be moved around the screen where the user preferred.

Our next challenge was to create a way the items currently on the screen could be easily removed. Our sponsor thought that it would be a neat idea to have a recycle bin and be able to drag the objects onto the recycle bin to delete them like in the windows operating system. In order to accomplish this task we created a picture of the recycle bin and gave it a label. Using a function called hit test the program is able to tell if the current object is in contact with the recycle bin. If the object does come in contact with the recycle bin the visibility is set back to invisible and a sound is played similar to the sound that is played in windows when you drag something into the recycle bin. This gives the illusion of creating and deleting objects without actually having to write the code to create and delete them.

The last thing that we were tasked with was creating a new navigation pain for the entire movie. We made an introductory screen with a little greeting and a quick explanation of the site. We also made a selection screen between the pre-made exhibits and the create-your-own exhibit. Lastly, sound effects and a musical background selector were added to give the movie even more multimedia attractiveness.

4.5 Photographed Exhibits

As described in previous sections, the photographs used in the Virtual Exhibit were modified without the original background and resized specifically for the website. Descriptions were added to the photographs, highlighting intriguing facts about the artifact's historical value. Both the exhibit images and depictions were provided by the Danish National Museum historical archives specifically for the creation of the Virtual Exhibit. A complete itemization of the

revised photographs and short descriptions are included in Appendix F. Photographs showing an array of interests are illustrated below.

The first two exhibits shown are artifacts specifically important to the National Museum, both in historical context and popularity. The older of the two exhibits is the Golden Chariot, dating back to the Early Bronze Age, 1700-1000 BC. An individual's relationship with nature solidified their religion. Myths were incorporated into everyday life and were expressed through objects that had symbolic and ceremonial uses. The Sun Chariot itself was found in a peat bog in 1902 in Odsherred. Two bronze plates were cast together, one side representing the sun and covered with gold. An intricate statue of a horse is placed in the forefront of the six-wheeled, immovable structure.

The Golden Horns from the Iron and Viking Ages, 200-1000 AD, are also quite popular in the museum. From Gallehus in Jutland, the horns were discovered on many occasions. A young girl originally found one of the horns in a field in 1639. The smaller of the horns was found in 1734 by another gentleman. Both artifacts were given to the Crown and were stolen in 1802 by a thief who used them to make jewelry. Using police reports and other documents, copies of the golden horns were created in the 1860s and more accurate replicas were made in 1979. Both copies are now on display in the museum. It is guessed that these horns were originally created in the 5th century and placed into the social as offerings.

Visitors expressed a strong interest in religion and an array of religious artifacts was included in the Virtual Exhibit. One example is the Frøslev Casket from Northern Europe, 1100-

1150 AD. During this time, many reliquaries of the Church were made of gold or silver-gilt with intricate enamelwork. This small casket has a detachable crucifix and was potentially used as a small, portable altar.

A variety of weapons were incorporated into the exhibit, accommodating interests in the Death and Punishment category. This sword, specifically, was not used for death or punishment. Instead, it was produced at the Danish Weapons Factory in 1648 as a coronation sword for King Frederik III. Etchings of the past and future kings were included in the artwork of the sword.

Artwork depicts the lifestyle of Danish citizens of the past. This painting was of Madame Bagge and her husband with the birth-room in 1782. During this time, it was common to celebrate common tasks with food and celebrations. In this instance, a woman would receive visitors after the birth of her child. A party was held in celebration of the birth for all of the women assisting with the process.

During the 1970-80s, Danish culture was changing dramatically. A women's movement that created an awareness of gender was founded, known as the Redstockings. The women held demonstrations and posted banners campaigning for social change. The poster shown here was from 1984, relaying the slogan "No women's liberation without class liberation – no class liberation without women's liberation."

The photographs and descriptions should provide a solid example of the wide array of exhibits displayed in the museum, including the themes developed during the project. The above

photographs embody the concept behind creating the themes of Death and Destruction, Fashion, Wealth and Prosperity, Art and Design, Religion, and Danish Prehistory. More exhibits can be added to the Virtual Exhibit in the future as other interests become prominent.

5. Conclusions and Recommendations

At this point, the Virtual Exhibit is fully accessible through our website and it is up to the museum to decide whether they would like to put a link to it on their website or possibly host it on their server. We believe that by including a link to it and advertising the Virtual Exhibit on their website they will see both an increase in traffic on their website and an increase in attendance at the museum itself.

In terms of customization we believe that we have included a sufficient amount of pictures, as our sample exhibits indicate, along with the customizable plaques that each exhibit will consist of very different themes and text, so that two separate individuals would both produce two very different exhibits. One further level of customization that was added later in the project is the ability to select up to five different background music tracks to be played in the users exhibit.

The only real roadblock that we encountered during our project was trying to give the user the ability save and email their virtual exhibit to friends and family. The problem occurred as we were testing the output capabilities of Flash, as well as it's capability to read input text files. After some research we came to the conclusion that the best way to implement this concept would be to use a script called PHP, that would be able to take the information outputted by Flash and create a text file containing variables pertaining to the different locations of objects, text, and styles in the exhibit. The script would then email this text file with a link to a reader

program, which when clicked by the user, would read the text file and insert all the variables into a Flash document which would then be displayed in the user's web browser. Theoretically we believed we should have been able to do this easily, however there were a few complications during the development of the program.

Currently, WPI web space does not support PHP programs or scripts and neither does the museum's server. PHP applications are not supported by many sites due to their nature of adding and removing data on the server. This restriction is mostly for data security. This presents a very grave problem because these are the primary spaces we have available to us. In order to test the functionality of our program we had to sign up for a trial web space at http://museum.badcrayon.net. This server supported the necessary software required to make the saving and email function.

The second difficulty that we encountered was actually making the PHP application. We used a tutorial located at Actionscript.org named "Ecards and other dynamic systems by Jessie Stratford." The tutorial was successful in making an output and text creation application; however, it failed to create a working email and reader program. We believe there are problems in the coding of the tutorial, however as we are not fluent in PHP we would have had to spend weeks learning this new program in order to diagnose the issues within the tutorial. Thankfully we were able to contact Tobias Jørgensen, a student at DTU, who was fluent in both Flash and Actionscipt. He was able to discover some flaws in the code we had created and we were eventually able to create a savable Virtual Exhibit.

The Danish National Museum has many options to choose from that would increase young adults' interest in the museum. As our studies have shown, it would be beneficial to incorporate technology into the advertising towards this age group (14-35), seeing as

technological advancements are generally followed closely by today's youth. There are many options to consider when choosing the best form of advertisement; we realize that the Museum's budget has not allotted funds for this project, but it may prove useful to allot a certain amount of money towards the development and implementation of these new marketing tools. Any of the following proposals could only lead to a higher awareness of the Danish National Museum.

5.1 Current Flash Website

The Flash website developed during this project is available to the public once posted on a server. The website itself does not require maintenance, but in order to sustain public interest in the museum, it is recommended that the site is further developed. Updates highlighting current special exhibits and occasions would greatly increase interest in the museum among the younger age group. One current event which we have already incorporated into the exhibit is the 200th anniversary of the museum being celebrated in May 2007. The museum has created a logo for the celebration which we have included on the first scene of the exhibit. Other ideas which could be included would be a special virtual exhibit with items taken from the museums current temporary exhibit as well as advertisements for special events they are holding such as trips to historical sites, or dedications of new items.

5.2 Maintenance of the Current Flash Website

The first option does not require a budget, and would produce a product similar to the Virtual Exhibit constructed during this project. By using online tutorials and learning the basics of Flash, any individual with a web browser and the Adobe Flash 8 software can design a simple create-your-own exhibit site. The site requires low maintenance once completed and would be a

useful way to introduce new exhibits into the daily lives of the public. Photography updates would emphasize current special exhibitions within the museum, highlighting useful information for the consumer.

5.3 Professional Flash Website

The Virtual Exhibit supports the attraction to modern technology by letting a guest interact with the museum at home. Assuming that the program can be saved and sent to friends and family, it would enable many individuals to learn about the museum. Hopefully after the experience, an interest in visiting the museum will be created and attendance will increase. Because of the program's potential possibilities, it would be useful to considering hiring professionals to create this program, ensuring that an advanced website is generated for the public. A thorough understanding of Flash is needed to create more advanced sites that would be most appealing to the young adult users.

Professionals who have a thorough understanding of the Flash 8 program and PHP saving capabilities would allow for this project to be well designed and easily accessible for the everyday user. The ability to save and send your own Virtual Exhibit is integral to the overall concept of sparking interest in the museum; thus, we highly recommend that this development be further researched and updated for any future updates to the Virtual Exhibit.

5.4 Kiosk

Another option to consider is to have a kiosk placed in the Danish National Museum, where visitors could create a postcard or email that could be sent to friends and family. A kiosk would allow the visitor to place themselves in the context of the museum. Being able to

incorporate yourself into a project you developed would generate more interest, making better use of the proposed project. A complete description of the possibility of this option along with a brief cost analysis is included in Appendix C.

5.5 Interactive Survey Concept

A further assessment of the Flash website would be beneficial to the Danish National Museum because it would provide a more comprehensive understanding of the project's effectiveness. Specifically, an online survey offered to those who interacted with the website would confirm or deny the success of the project. It is proposed that a survey is completed with any of the developments listed above so that an accurate assessment of the effectiveness of the Virtual Exhibit is compiled.

5.6 Summary of Recommendations

- Maintain the current website with the online Flash 8 tutorials using individuals who have a basic knowledge of computer programming.
- Hire professional programmers to create a more developed Flash 8 website.
- Introduce a kiosk station into the Danish National Museum where visitors can create projects during their visit.
- With the above suggestions, create an interactive survey that assesses user interest in the Virtual Exhibit.

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7. Appendices

Appendix A: Alternatives

Throughout the discussion of the background section we talked about our marketing tool and how to implement it as a Virtual Exhibit. Before this idea was decided upon we looked at various alternative ways to market on the internet. Just a few of the ideas are listed below.

Online Comment Database or Discussion Board - This idea would involve creating a page for each exhibit within the museum and posting pictures from them on it. There would then be a discussion board linked with each exhibit where users could make comments about the exhibit or share information with each other about it. A good example of the kind of message board which could be created can be found at http://www.newarkmuseum.org/journal/ which is a message board for the Newark Museum.

Online Communities and Games - Our group also looked into creating some sort of online community or game where people from all over Denmark could log into it and not only get information about the Danish museum but also participate in educational games and activities. As an example of what such an online world could look like we looked into the program Second Life. A product description can be found below.

> Second Life is a 3-D virtual world entirely built and owned by its residents. Since opening to the public in 2003, it has grown explosively and today is inhabited by a total of 3,480,114 people from around the globe.
>
> –Product Website (http://secondlife.com/whatis/)

The company also offers free virtual land for educational purposes within the world. So it would be possible to create a virtual museum within the world. The actual program proved far

more intricate and complicated then we had original thought. After creating a new user we tried to go through the tutorial included with the game and encountered numerous problems which ranged from control issues up through connection problems. All-and-all this idea was dropped as a viable concept due to advanced complexity and user issues.

Appendix B: The Internet

The internet as we know and love it today is almost a complete reinvention of what it was originally designed to do. The original programmers who built a small four computer network in the 1960's would never have imagined that there project could have grown so much, spread so far, and have such a social impact as it does today. The original version of the internet was created by the US Department of Defense Advanced Research Projects Agency (DARPA) in 1969. Nicknamed ARPANet it was a special project investigating the use of new "packet technology" in order to transfer large amounts of data in a short time period. (Weinstein, 2005) The testing, reinvention, and retesting of this network continued into the early 1980's. Eventually the government split the network into two sections. One was kept as the military project and was still a secured network; the other was handed over for public use as a research and educational tool for Universities. "One of the most striking things about the Internet in the 1980s was its meteoric growth. In the fall of 1985 about 2000 computers had access to the Internet; by the end of 1987 there were almost 30,000, and by October of 1989 the number had grown to 159,000." (Abbate, 1999) The internet explosion continued into the 1990's as companies like IBM, Gateway, and Apple began to see the possibilities of home computers to become connected to this "global network." The internet soon became more then just a research tool as chat programs, video games, shopping sites emerged as the most popular reasons to connect to the internet. The evolution of the internet continues even to this day as every week there are more sites created, more data stored and more users logging onto this virtual network.

Appendix C: Project Foundation for E-Kiosk

In beginning to actually create our project we realized that there would be two main issues that we would have to deal with. Budget and hardware are two factors that no matter how much research, surveying, and writing one does you can never get around. A discussion of each of these components and why they are relevant follows below.

This project requires a fairly decent budget to even get off the ground and the more complex we or our sponsor wishes to make it the more expensive it will become. A rough estimate of just how much money would be required is listed below. These are all base components that will be required at the very least in order to complete the project. This is only a preliminary budget and if needed certain expenses could be cut, such as the green screen and maybe a less powerful version of Flash.

Kodak EasyShare C875 8MP Digital Camera with 5x Optical Zoom	**$177.87**
Flash Professional 8	**$699**
Dell Dimension E520	**$698**
Green Screen	**$100**
Microphone	**$25**
Total	$1675

Table 7: Kiosk Budget Analysis (Price Quotes from Amazon.com)

The hardware required for this project for the most part just includes those things in the budget. The camera is so we can take the photos of the individual, and the green screen is put behind them so that we can import the photos digitally and put museum backgrounds where the green is. Flash is going to be used to create the Virtual Exhibit and the computer is so that we have a platform to work off of, also if the user has to create it themselves a computer would be required. The microphone is so audio messages can be added to the exhibit. Besides these tools

we will also require many high quality images taken from around the museum to import into the postcards.

Appendix D: Original Survey

Survey

Background

1. Age
   - ☐ 14-19
   - ☐ 20-25
   - ☐ 26-30
   - ☐ 31-35
   - ☐ Other
2. Sex
   - ☐ Male
   - ☐ Female
3. Native to…
   - ☐ Copenhagen
   - ☐ Denmark
   - ☐ Other Country
4. Are you a member of the museum?
   - ☐ Yes
   - ☐ No

Interests

5. What was your favorite part of the museum?

6. List any museums you have visited in the past year. What did you like/dislike about your visit(s)?

Technology

7. On a scale of 1-5, how comfortable are you using computers and the internet?

   Very Uncomfortable Very Comfortable

   1 2 3 4 5

8. Have you ever sent or received an E-Postcard?
   - ☐ Sent
   - ☐ Received
   - ☐ Neither
9. If so, what did you like and dislike about the E-Postcard?

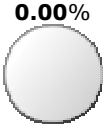
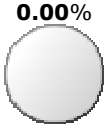
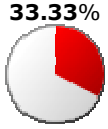
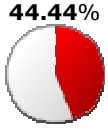
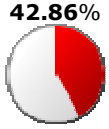
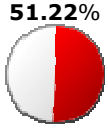
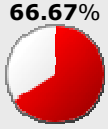
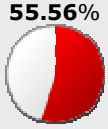
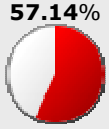
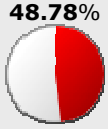
E-Postcard Multimedia

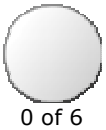
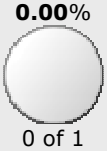
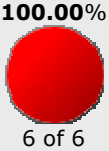
10. Do you use email at least once a week?
    - ☐ Yes
    - ☐ No
11. Would you prefer receiving an E-Postcard through e-mail as a…
    - ☐ Link
    - ☐ Part of the message
    - ☐ Indifferent
12. If you were to receive an E-Postcard, what type of media would you most enjoy?
    - ☐ Pictures
    - ☐ Video
    - ☐ Audio
13. If you had the option of sending an E-postcard about your museum visit to a friend at the end of your museum experience would you?
    - ☐ Yes
    - ☐ No
14. Would you like to receive information about new museum exhibits in the E-postcard?
    - ☐ Yes
    - ☐ No
15. Can you think of anything else you may wish to see in an E-postcard from the museum?

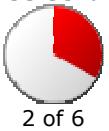
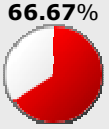
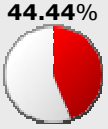
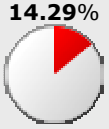
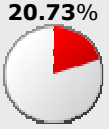
Appendix E: Survey Graphs and Data – Cross Tabulation

Age and Results

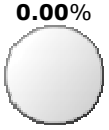
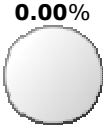
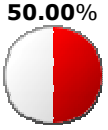
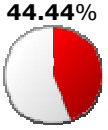
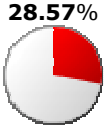
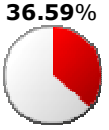
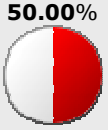
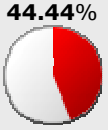
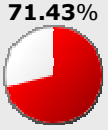
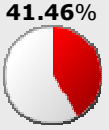
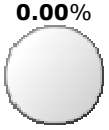
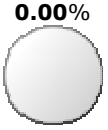
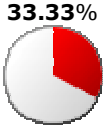
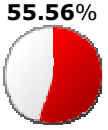
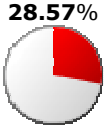
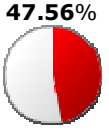
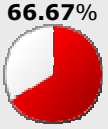
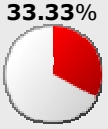
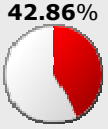
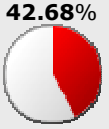
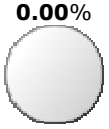
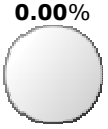
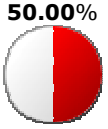
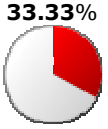
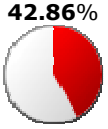
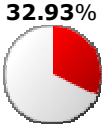
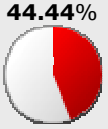
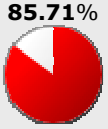
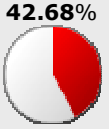
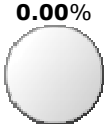
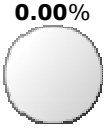
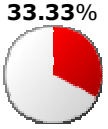
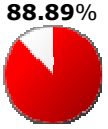
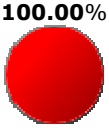
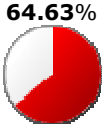
Alder (Age)						
Alder	**<14**	**14-19**	**20-25**	**26-30**	**31-35**	**>35**
<14	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**0.00%** 0 of 9	**0.00%** 0 of 7	**0.00%** 0 of 82
14-19	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**0.00%** 0 of 9	**0.00%** 0 of 7	**0.00%** 0 of 82
20-25	**0.00%** 0 of 1	**0.00%** 0 of 1	**100.00%** 6 of 6	**0.00%** 0 of 9	**0.00%** 0 of 7	**0.00%** 0 of 82
26-30	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**100.00%** 9 of 9	**0.00%** 0 of 7	**0.00%** 0 of 82
31-35	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**0.00%** 0 of 9	**100.00%** 7 of 7	**0.00%** 0 of 82
>35	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**0.00%** 0 of 9	**0.00%** 0 of 7	**100.00%** 82 of 82

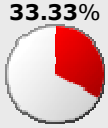
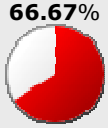
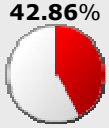
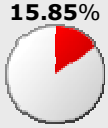
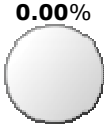
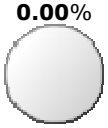
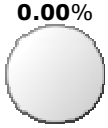
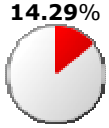
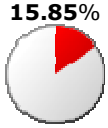
Køn (Gender)	<14	14-19	20-25	26-30	31-35	>35
Mand (Male)	**0.00%**  0 of 1	**0.00%**  0 of 1	**33.33%**  2 of 6	**44.44%**  4 of 9	**42.86%**  3 of 7	**51.22%**  42 of 82
Kvinde (Female)	**0.00%**  0 of 1	**0.00%**  0 of 1	**66.67%**  4 of 6	**55.56%**  5 of 9	**57.14%**  4 of 7	**48.78%**  40 of 82

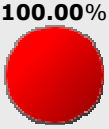
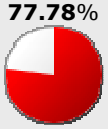
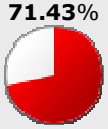
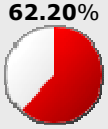
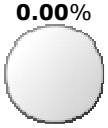
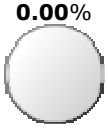
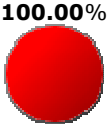
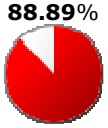
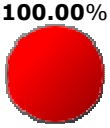
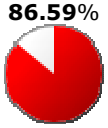
Er du medlem af museumsklubben? (Are you a member of the Museum Club?)	<14	14-19	20-25	26-30	31-35	>35
Ja (Yes)	**0.00%**  0 of 1	**0.00%**  0 of 1	**0.00%**  0 of 6	**0.00%**  0 of 9	**0.00%**  0 of 7	**14.63%**  12 of 82
Nej (No)	**0.00%**  0 of 1	**0.00%**  0 of 1	**100.00%**  6 of 6	**100.00%**  9 of 9	**100.00%**  7 of 7	**85.37%**  70 of 82

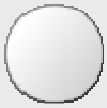
Har du nem adgang til at optage lyd på din PC? (Do you have the means to easily record audio with your computer?)	<14	14-19	20-25	26-30	31-35	>35
Ja (Yes)	**0.00%**  0 of 1	**0.00%**  0 of 1	**33.33%**  2 of 6	**55.56%**  5 of 9	**85.71%**  6 of 7	**79.27%**  65 of 82
Nej (No)	**0.00%**  0 of 1	**0.00%**  0 of 1	**66.67%**  4 of 6	**44.44%**  4 of 9	**14.29%**  1 of 7	**20.73%**  17 of 82

Hvilke udstillinger på Nationalmuseet synes du bedst om: (Your favorite exhibitions at the Danish National Museum include:)	<14	14-19	20-25	26-30	31-35	>35
Danmarks Oldtid (Prehistory)	**0.00%** 0 of 1	**0.00%** 0 of 1	**33.33%** 2 of 6	**44.44%** 4 of 9	**57.14%** 4 of 7	**57.32%** 47 of 82
Antiksamlingen (Classical and Near Eastern Antiquities)	**0.00%** 0 of 1	**0.00%** 0 of 1	**33.33%** 2 of 6	**11.11%** 1 of 9	**0.00%** 0 of 7	**18.29%** 15 of 82
Middelalder og Renæssance (Middle Ages and Renaissance)	**0.00%** 0 of 1	**0.00%** 0 of 1	**33.33%** 2 of 6	**66.67%** 6 of 9	**71.43%** 5 of 7	**53.66%** 44 of 82
Danmarkshistorier (Danmark 1660-2000) (Modern Danish History)	**0.00%** 0 of 1	**0.00%** 0 of 1	**50.00%** 3 of 6	**66.67%** 6 of 9	**57.14%** 4 of 7	**54.88%** 45 of 82
Jordens Folk (Etnografisk Samling) (People of the World)	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**11.11%** 1 of 9	**28.57%** 2 of 7	**32.93%** 27 of 82
Den kgl. Mønt- og Medailjesamling (Royal Coin Collection)	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**22.22%** 2 of 9	**0.00%** 0 of 7	**9.76%** 8 of 82
Børnenes Museum (Children's Museum)	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**0.00%** 0 of 9	**28.57%** 2 of 7	**12.20%** 10 of 82
Andet (Other)	**0.00%** 0 of 1	**0.00%** 0 of 1	**16.67%** 1 of 6	**11.11%** 1 of 9	**0.00%** 0 of 7	**6.10%** 5 of 82

Hvilke emner synes du er spændende: (Your areas of interest include:)	<14	14-19	20-25	26-30	31-35	>35
Våben og rustninger (Weapons and Armor)	**0.00**%  0 of 1	**0.00**%  0 of 1	**50.00**%  3 of 6	**44.44**%  4 of 9	**28.57**%  2 of 7	**36.59**%  30 of 82
Død og begravelse (Death)	**0.00**%  0 of 1	**0.00**%  0 of 1	**50.00**%  3 of 6	**44.44**%  4 of 9	**71.43**%  5 of 7	**41.46**%  34 of 82
Smykker, skate (Jewelry)	**0.00**%  0 of 1	**0.00**%  0 of 1	**33.33**%  2 of 6	**55.56**%  5 of 9	**28.57**%  2 of 7	**47.56**%  39 of 82
Tøj – moden gennem tiderne (Clothing)	**0.00**%  0 of 1	**0.00**%  0 of 1	**66.67**%  4 of 6	**33.33**%  3 of 9	**42.86**%  3 of 7	**42.68**%  35 of 82
Design (møbler/arkitektur) (Furniture/Architecture)	**0.00**%  0 of 1	**0.00**%  0 of 1	**50.00**%  3 of 6	**33.33**%  3 of 9	**42.86**%  3 of 7	**32.93**%  27 of 82
Forbrydelse og straf (Punishment)	**0.00**%  0 of 1	**0.00**%  0 of 1	**50.00**%  3 of 6	**44.44**%  4 of 9	**85.71**%  6 of 7	**42.68**%  35 of 82
Religion, tro og overtro (Religion)	**0.00**%  0 of 1	**0.00**%  0 of 1	**33.33**%  2 of 6	**88.89**%  8 of 9	**100.00**%  7 of 7	**64.63**%  53 of 82

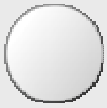
Romantik – kærlighed (Romance)	**0.00%**  0 of 1	**0.00%**  0 of 1	**33.33%**  2 of 6	**66.67%**  6 of 9	**42.86%**  3 of 7	**15.85%**  13 of 82
Andet (Other)	**0.00%**  0 of 1	**0.00%**  0 of 1	**0.00%**  0 of 6	**11.11%**  1 of 9	**14.29%**  1 of 7	**15.85%**  13 of 82

I en webudstilling vil jeg gerne se: (In an online exhibition, would you like to see:)	**<14**	**14-19**	**20-25**	**26-30**	**31-35**	**>35**
Billeder af genstande (Pictures of Artifacts)	**0.00%**  0 of 1	**0.00%**  0 of 1	**83.33%**  5 of 6	**66.67%**  6 of 9	**85.71%**  6 of 7	**78.05%**  64 of 82
Beskrivelser af genstande (Descriptions of Artifacts)	**0.00%**  0 of 1	**0.00%**  0 of 1	**100.00%**  6 of 6	**77.78%**  7 of 9	**71.43%**  5 of 7	**62.20%**  51 of 82
Historisk information (General Historical Information)	**0.00%**  0 of 1	**0.00%**  0 of 1	**100.00%**  6 of 6	**88.89%**  8 of 9	**100.00%**  7 of 7	**86.59%**  71 of 82

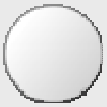
På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du da være I at lave en figur, som kan klædes på med tøj, og udstyr fra forskellige perioder? **(On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a customizable character that could be dressed with clothing and equipment from various historical periods?)**	**<14**	**14-19**	**20-25**	**26-30**	**31-35**	**>35**
1	**0.00%**  0 of 1	**0.00%**  0 of 1	**0.00%**  0 of 6	**33.33%**  3 of 9	**14.29%**  1 of 7	**37.80%**  31 of 82
2	**0.00%**  0 of 1	**0.00%**  0 of 1	**33.33%**  2 of 6	**33.33%**  3 of 9	**42.86%**  3 of 7	**8.54%**  7 of 82
3	**0.00%**  0 of 1	**0.00%**  0 of 1	**16.67%**  1 of 6	**11.11%**  1 of 9	**0.00%**  0 of 7	**15.85%**  13 of 82
4	**0.00%**  0 of 1	**0.00%**  0 of 1	**33.33%**  2 of 6	**11.11%**  1 of 9	**14.29%**  1 of 7	**17.07%**  14 of 82
5	**0.00%**  0 of 1	**0.00%**  0 of 1	**16.67%**  1 of 6	**11.11%**  1 of 9	**28.57%**  2 of 7	**20.73%**  17 of 82

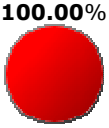
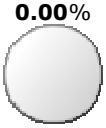
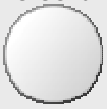
På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du være i at lave en webudstilling som andre kunne se? **(On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a custom online exhibition that others could view?)**	**<14**	**14-19**	**20-25**	**26-30**	**31-35**	**>35**
1	**0.00%** 0 of 1	**0.00%** 0 of 1	**16.67%** 1 of 6	**44.44%** 4 of 9	**28.57%** 2 of 7	**45.12%** 37 of 82
2	**0.00%** 0 of 1	**0.00%** 0 of 1	**0.00%** 0 of 6	**11.11%** 1 of 9	**28.57%** 2 of 7	**12.20%** 10 of 82
3	**0.00%** 0 of 1	**0.00%** 0 of 1	**16.67%** 1 of 6	**22.22%** 2 of 9	**0.00%** 0 of 7	**13.41%** 11 of 82
4	**0.00%** 0 of 1	**0.00%** 0 of 1	**50.00%** 3 of 6	**11.11%** 1 of 9	**14.29%** 1 of 7	**8.54%** 7 of 82
5	**0.00%** 0 of 1	**0.00%** 0 of 1	**16.67%** 1 of 6	**11.11%** 1 of 9	**28.57%** 2 of 7	**20.73%** 17 of 82

Hvis you lavede en din egen udstilling på Nationalmuseets hjemmeside, ville du da have lyst til at sende den til familie og venner? **(If you created a custom exhibition on the Danish National Museum's website, would you want to send it to friends and family?)**	**<14**	**14-19**	**20-25**	**26-30**	**31-35**	**>35**
Ja (Yes)	**0.00%** 0 of 1	**0.00%** 0 of 1	**83.33%** 5 of 6	**100.00%** 9 of 9	**85.71%** 6 of 7	**85.37%** 70 of 82

Nej (No)	**0.00**%  0 of 1	**0.00**%  0 of 1	**16.67**%  1 of 6	**0.00**%  0 of 9	**14.29**%  1 of 7	**14.63**%  12 of 82

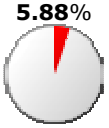
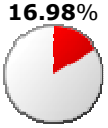
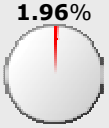
Gender and Results

Køn		
Alder (Age)	**Mand**	**Kvinde**
<14	**0.00**%  0 of 51	**0.00**%  0 of 53
14-19	**0.00**%  0 of 51	**0.00**%  0 of 53
20-25	**3.92**%  2 of 51	**7.55**%  4 of 53
26-30	**7.84**%  4 of 51	**9.43**%  5 of 53
31-35	**5.88**%  3 of 51	**7.55**%  4 of 53
>35	**82.35**%  42 of 51	**75.47**%  40 of 53

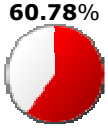
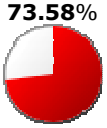
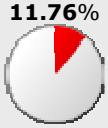
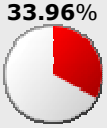
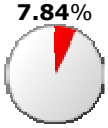
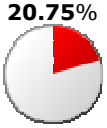
Køn (Gender)	Mand	Kvinde
Mand	**100.00**%  51 of 51	**0.00**%  0 of 53
Kvinde	**0.00**%  0 of 51	**100.00**%  53 of 53

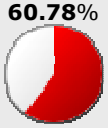
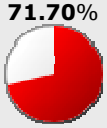
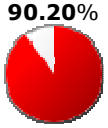
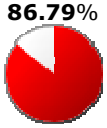
Er du medlem af museumsklubben? (Are you a member of the museum club?)	Mand	Kvinde
Ja	**15.69**%  8 of 51	**7.55**%  4 of 53
Nej	**84.31**%  43 of 51	**92.45**%  49 of 53

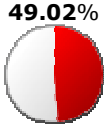
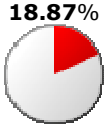
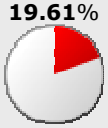
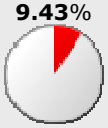
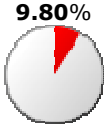
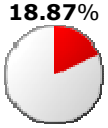
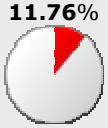
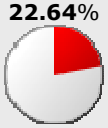
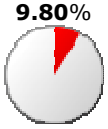
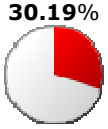
Har du nem adgang til at optage lyd på din PC? (Do you have the means to easily record audio with your computer?)	Mand	Kvinde
Ja (Yes)	**90.20**%  46 of 51	**60.38**%  32 of 53
Nej (No)	**9.80**%  5 of 51	**39.62**%  21 of 53

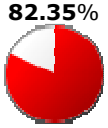
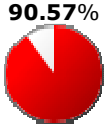
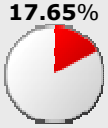
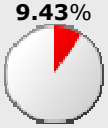
Hvilke udstillinger på Nationalmuseet synes du bedst om: (Your favorite exhibitions at the Danish National Museum include:)	Mand	Kvinde
Danmarks Oldtid (Prehistory)	**60.78**%  31 of 51	**49.06**%  26 of 53
Antiksamlingen (Classical and Near Eastern Antiquities)	**13.73**%  7 of 51	**20.75**%  11 of 53
Middelalder og Renæssance (Middle Ages and Renaissance)	**54.90**%  28 of 51	**54.72**%  29 of 53
Danmarkshistorier (Danmark 1660-2000) (Modern Danish History)	**50.98**%  26 of 51	**60.38**%  32 of 53
Jordens Folk (Etnografisk Samling) (People of the World)	**25.49**%  13 of 51	**32.08**%  17 of 53
Den kgl. Mønt- og Medailjesamling (Royal Coin Collection)	**13.73**%  7 of 51	**5.66**%  3 of 53
Børnenes Museum (Children's Museum)	**5.88**%  3 of 51	**16.98**%  9 of 53
Andet (Other)	**1.96**%  1 of 51	**11.32**%  6 of 53

Hvilke emner synes du er spændende: (Your areas of interest include:)	Mand	Kvinde
Våben og rustninger (Weapons and Armor)	**49.02**%  25 of 51	**26.42**%  14 of 53
Død og begravelse (Death)	**41.18**%  21 of 51	**47.17**%  25 of 53
Smykker, skate (Jewelry)	**37.25**%  19 of 51	**54.72**%  29 of 53
Tøj – moden gennem tiderne (Clothing)	**13.73**%  7 of 51	**71.70**%  38 of 53
Design (møbler/arkitektur) (Furniture/Architecture)	**25.49**%  13 of 51	**43.40**%  23 of 53
Forbrydelse og straf (Punishment)	**49.02**%  25 of 51	**43.40**%  23 of 53

Religion, tro og overtro (Religion)	**60.78**%  31 of 51	**73.58**%  39 of 53
Romantik – kærlighed (Romance)	**11.76**%  6 of 51	**33.96**%  18 of 53
Andet (Other)	**7.84**%  4 of 51	**20.75**%  11 of 53

I en webudstilling vil jeg gerne se: **(In an online exhibition, would you like to see:)**	**Mand**	**Kvinde**
Billeder af genstande (Pictures of Artifacts)	**72.55**%  37 of 51	**83.02**%  44 of 53
Beskrivelser af genstande (Descriptions of Artifacts)	**60.78**%  31 of 51	**71.70**%  38 of 53
Historisk information (General Historical Information)	**90.20**%  46 of 51	**86.79**%  46 of 53

På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du da være I at lave en figur, som kan klædes på med tøj, og udstyr fra forskellige perioder? **(On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a customizable character that could be dressed with clothing and equipment from various historical periods?)**	**Mand**	**Kvinde**
1	**49.02**%  25 of 51	**18.87**%  10 of 53
2	**19.61**%  10 of 51	**9.43**%  5 of 53
3	**9.80**%  5 of 51	**18.87**%  10 of 53
4	**11.76**%  6 of 51	**22.64**%  12 of 53
5	**9.80**%  5 of 51	**30.19**%  16 of 53

På en skala fra 1 til 5 (hvor 5 angiver, at du er meget interesseret), hvor interesseret ville du være i at lave en webudstilling som andre kunne se? (On a scale from 1 to 5 (1 being not interested and 5 being very interested), how interested would you be in creating a custom online exhibition that others could view?)	Mand	Kvinde
1	**43.14**%  22 of 51	**41.51**%  22 of 53
2	**15.69**%  8 of 51	**9.43**%  5 of 53
3	**13.73**%  7 of 51	**13.21**%  7 of 53
4	**17.65**%  9 of 51	**5.66**%  3 of 53
5	**9.80**%  5 of 51	**30.19**%  16 of 53
Hvis you lavede en din egen udstilling på Nationalmuseets hjemmeside, ville du da have lyst til at sende den til familie og venner? **(If you created a custom exhibition on the Danish National Museum's website, would you want to send it to friends and family?)**	**Mand**	**Kvinde**
Ja	**82.35**%  42 of 51	**90.57**%  48 of 53
Nej	**17.65**%  9 of 51	**9.43**%  5 of 53

Survey Analysis of Computer Capabilities

Details	Date	Browser	OS type	Country
104	17.Apr.2007 01:32	Internet Explorer 6.0	Windows XP	Unresolved
103	12.Apr.2007 07:23	Internet Explorer 6.0	Windows XP	Denmark
102	11.Apr.2007 05:38	Internet Explorer 6.0	Windows XP	Denmark
101	11.Apr.2007 04:04	Internet Explorer 6.0	Windows XP	Unresolved
100	11.Apr.2007 01:58	Internet Explorer 7.0	Windows XP	Denmark
99	11.Apr.2007 01:11	Internet Explorer 6.0	Windows XP	Denmark
98	10.Apr.2007 04:58	Internet Explorer 7.0	Windows XP	Iceland
97	10.Apr.2007 02:57	Internet Explorer 7.0	Windows XP	Denmark
96	10.Apr.2007 02:48	Internet Explorer 6.0	Windows 2000	Denmark
95	10.Apr.2007 01:31	Internet Explorer 6.0	Windows XP	Unresolved
94	10.Apr.2007 00:52	Netscape 7.0	Windows 2000	Denmark
93	9.Apr.2007 23:51	Internet Explorer 7.0	Windows XP	Unresolved
92	9.Apr.2007 23:12	Internet Explorer 7.0	Windows XP	Denmark
91	9.Apr.2007 22:44	Safari	MacOS X	Denmark
90	9.Apr.2007 11:47	Internet Explorer 6.0	Windows XP	Denmark
89	9.Apr.2007 09:50	Internet Explorer 6.0	Windows XP	Denmark
88	9.Apr.2007 09:34	Internet Explorer 7.0	Windows XP	Denmark
87	9.Apr.2007 06:36	Internet Explorer 7.0	Windows XP	Denmark
86	9.Apr.2007 05:58	Internet Explorer 7.0	Windows XP	Denmark
85	9.Apr.2007 02:16	Internet Explorer 6.0	Windows 2000	Denmark
84	8.Apr.2007 13:56	Internet Explorer 6.0	Windows XP	Denmark
83	8.Apr.2007 10:37	Internet Explorer 6.0	Windows XP	Denmark

82	8.Apr.2007 09:31	Internet Explorer 7.0	Windows XP	Denmark
81	8.Apr.2007 09:09	Internet Explorer 7.0	Windows XP	Denmark
80	8.Apr.2007 08:55	Internet Explorer 6.0	Windows XP	Denmark
79	8.Apr.2007 04:25	Firefox 2.0.0.3	Windows XP	Denmark
78	8.Apr.2007 04:12	Internet Explorer 7.0	Windows XP	Denmark
77	8.Apr.2007 00:04	Internet Explorer 6.0	Windows 98	Denmark
76	7.Apr.2007 03:40	Internet Explorer 6.0	Windows XP	Denmark
75	7.Apr.2007 03:30	Internet Explorer 7.0	Windows XP	Denmark
74	7.Apr.2007 03:18	Firefox 1.5.0.11	Windows XP	Denmark
73	6.Apr.2007 13:02	Internet Explorer 6.0	Windows XP	Denmark
72	6.Apr.2007 12:22	Internet Explorer 6.0	Windows XP	Denmark
71	6.Apr.2007 10:31	Firefox 1.5.0.11	Windows XP	Denmark
70	6.Apr.2007 10:15	Internet Explorer 6.0	Windows XP	Denmark
69	6.Apr.2007 08:42	Internet Explorer 6.0	Windows XP	Denmark
68	6.Apr.2007 08:27	Internet Explorer 7.0	Windows XP	Denmark
67	6.Apr.2007 02:47	Internet Explorer 6.0	Windows XP	Denmark
66	6.Apr.2007 02:33	Internet Explorer 7.0	Windows XP	Unresolved
65	6.Apr.2007 02:11	Internet Explorer 6.0	Windows XP	Unresolved
64	6.Apr.2007 01:25	Internet Explorer 7.0	Windows XP	Denmark
63	6.Apr.2007 00:22	Firefox 1.5.0.10	Windows XP	Denmark
62	5.Apr.2007 22:40	Firefox 1.5.0.11	Windows 2000	Denmark
61	5.Apr.2007 19:44	Internet Explorer 7.0	Windows XP	Denmark
60	5.Apr.2007 17:42	Firefox 1.5.0.10	Linux	Network
59	5.Apr.2007 15:58	Internet Explorer 7.0	Windows XP	Commercial
58	5.Apr.2007 15:23	Internet Explorer 6.0	Windows XP	Denmark
57	5.Apr.2007 14:39	Firefox 2.0.0.3	Windows XP	Denmark

56	5.Apr.2007 14:21	Firefox 2.0.0.3	Windows XP	Denmark
55	5.Apr.2007 13:57	Internet Explorer 6.0	Windows XP	Denmark
54	5.Apr.2007 13:04	Firefox 2.0.0.3	Windows XP	Denmark
53	5.Apr.2007 12:27	Internet Explorer 6.0	Windows XP	Denmark
52	5.Apr.2007 11:21	Internet Explorer 7.0	Windows XP	Denmark
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49	5.Apr.2007 08:50	Internet Explorer 6.0	Windows XP	Denmark
48	5.Apr.2007 08:40	Internet Explorer 6.0	Windows XP	Denmark
47	5.Apr.2007 08:32	Firefox 2.0.0.3	Windows XP	Denmark
46	5.Apr.2007 08:21	Internet Explorer 7.0	Windows XP	Denmark
45	5.Apr.2007 05:46	Internet Explorer 7.0	Windows XP	Denmark
44	5.Apr.2007 05:33	Internet Explorer 7.0	Windows XP	Denmark
43	5.Apr.2007 05:14	Internet Explorer 7.0	Windows XP	Denmark
42	5.Apr.2007 04:54	Firefox 2.0.0.3	Windows XP	Denmark
41	5.Apr.2007 04:41	Internet Explorer 6.0	Windows XP	Denmark
40	5.Apr.2007 04:23	Internet Explorer 7.0	Windows XP	Denmark
39	5.Apr.2007 04:22	Internet Explorer 6.0	Windows 2003 Server	Denmark
38	5.Apr.2007 04:04	Internet Explorer 6.0	Windows XP	Denmark
37	5.Apr.2007 03:41	Internet Explorer 6.0	Windows XP	Denmark
36	5.Apr.2007 03:18	Internet Explorer 7.0	Windows XP	Denmark
35	5.Apr.2007 03:15	Internet Explorer 6.0	Windows XP	Denmark
34	5.Apr.2007 02:59	Firefox 1.0.7	Windows XP	Unresolved
33	5.Apr.2007 02:51	Internet Explorer 6.0	Windows 98	Denmark
32	5.Apr.2007 02:47	Internet Explorer 6.0	Windows XP	Denmark
31	5.Apr.2007 02:47	Internet Explorer 6.0	Windows XP	Denmark

30	5.Apr.2007 02:25	Firefox 2.0	Windows XP	Denmark
29	5.Apr.2007 02:14	Internet Explorer 6.0	Windows XP	Denmark
28	5.Apr.2007 01:33	Internet Explorer 7.0	Windows XP	Denmark
27	5.Apr.2007 01:33	Internet Explorer 6.0	Windows XP	Denmark
26	5.Apr.2007 01:25	Internet Explorer 6.0	Windows XP	Denmark
25	5.Apr.2007 01:24	Internet Explorer 7.0	Windows XP	Denmark
24	5.Apr.2007 01:22	Internet Explorer 6.0	Windows XP	Denmark
23	5.Apr.2007 01:21	Internet Explorer 6.0	Windows XP	Denmark
22	5.Apr.2007 00:54	Internet Explorer 7.0	Windows XP	Denmark
21	5.Apr.2007 00:48	Netscape 7.02	Mac OS	Denmark
20	5.Apr.2007 00:40	Internet Explorer 6.0	Windows XP	Denmark
19	5.Apr.2007 00:24	Internet Explorer 6.0	Windows XP	Denmark
18	5.Apr.2007 00:22	Internet Explorer 7.0	Windows XP	Unresolved
17	5.Apr.2007 00:15	Internet Explorer 7.0	Windows XP	Denmark
16	4.Apr.2007 23:55	Internet Explorer 7.0	Windows XP	Denmark
15	4.Apr.2007 23:34	Internet Explorer 7.0	Windows XP	Denmark
14	4.Apr.2007 23:31	Internet Explorer 6.0	Windows XP	Denmark
13	4.Apr.2007 23:19	Internet Explorer 7.0	Windows XP	Denmark
12	4.Apr.2007 22:51	Internet Explorer 6.0	Windows XP	Denmark
11	4.Apr.2007 22:43	Internet Explorer 6.0	Windows XP	Denmark
10	4.Apr.2007 22:41	Internet Explorer 7.0	Windows XP	Denmark
9	4.Apr.2007 22:31	Internet Explorer 7.0	Windows XP	Denmark
8	4.Apr.2007 17:18	Firefox 2.0.0.3	Windows XP	Denmark
7	4.Apr.2007 17:14	Internet Explorer 6.0	Windows XP	Denmark
6	4.Apr.2007 17:07	Firefox 2.0.0.3	Windows XP	Denmark
5	4.Apr.2007 16:53	Firefox 2.0.0.3	Windows XP	Denmark

4	4.Apr.2007 16:24	Internet Explorer 6.0	Windows XP	Unresolved
3	4.Apr.2007 16:15	Internet Explorer 7.0	Windows XP	Unresolved
2	4.Apr.2007 16:01	Internet Explorer 6.0	Windows XP	Denmark
1	4.Apr.2007 15:27	Internet Explorer 7.0	Windows XP	Denmark

Appendix F: Photographs and Descriptions

Prehistory of Denmark

The Sun Chariot (Trundholm bog in Odsherred on Sealand, Early Bronze Age, 1400 BC) The figure represents the sun, the gold-covered bronze disc which is pulled across the sky by a horse.

The Gundestrup Cauldron (Himmerland, Pre-Roman or Celtic Iron Age, 500 – 0 BC) Seven of the eight original plaques are preserved, depicting gods and goddesses, bullfights, warriors, and sacrificial scenes.

The Golden Horns (Gallehus near Møgeltønder, Iron Age and Viking Age, 200-1000 AD) Found in 1639 and again in 1734. Both horns were given to the Crown and stolen in 1802 to be melted down for the gold. New investigations and examination of the police reports allowed for copies to be made in 1979. The original golden horns were both double-walled, with a smooth inner horn covered in outer rings.

Danish Middle Ages and Renaissance

The Irish Shrine / Rannveig's Casket (Ireland or Scotland, 8th Century) Reliquary of tinned copper with enamelwork with the inscription "Rannveig owns this casket" alongside graffiti of Viking-ships' prows. The casket was no doubt stolen by a Norwegian Viking at about that time.

The Roskilde Cross (12th Century) A Byzantine reliquary cross of gold, pearls and gemstones, discovered inside the head of the Christ from the chancel-arch crucifix of Roskilde Cathedral.

Plates of Tamdrup Church (West of Horsens, 1200 AD) Seven of the 29 plates may originally have adorned a reliquary casket, while the remainder were part of a frontal. Four reliefs recount the tale of Poppo, who c.965 carried red-hot iron in his successful attempt to convert King Harold Bluetooth to Christianity.

Vatnås Reliquary (Norway, 1250 AD) This is a Gilded reliquary. The figures of the Saints have been formed from moulds that were also used for other caskets from the same Norwegian workshop.

The Gunhild Cross (1150 AD) Carved out of walrus-tusk, Latin inscriptions name "Liutger, who has carved me at the behest of Helena, also called Gunhild". The figure of Christ from the front side is missing and the reverse is carved with scenes of Doomsday.

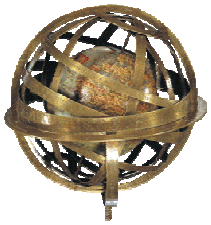
The Frøslev Casket (Northern Europe, 1100-1150 AD) Found in Frøslev Moss in South Jutland in 1872. This small casket with gilt copper and champlevé enamel has a detachable crucifix. It may have been used as a portable altar.

Treasure Hoard (Kirial, Djursland, 1365 AD) The two bronze pots were found by a farmer while plowing in 1867, containing no fewer than 81,422 silver coins.

'The Rose' (1577) A silver-gilt drinking vessel weighting almost 6kg that was donated for the christening in 1577 of the later King Christian IV by the noble couple Hans Skovgaard and Anne Parsberg.

The Golden Rod: Christian IV's Ceremonial Dagger (1575) The gilt silver sheath contains a long gilt dagger, knife and hunting-spike. Among the symbolic scenes on the sheath are the heroes St. George and Hercules, as well as the goddess of fortune – Fortuna.

Wooden Chest (1549) Dower chest produced for the marriage of Vibeke Podebusk. The chest is carved in Renaissance style with acanthus, masks, and portrait medallions.



Armillary Sphere (1543) A model of the Universe, signed by the mapmaker Caspar Vopel. The Earth is encircled by 11 rings, representing the planetary orbits.

Mechanical Armillary Sphere Clock (Strasbourg, 1572) Made by Josias Habrecht, the clock has a mechanical armillary sphere. The four sides of the clock-case show the hours, quarters, degree of latitude and the days of the week. The model of the Universe has the Earth in the centre.

Traveling Clock (Dresden, early 1600s) Traveling clock, signed by the German master Hans Schneberger, meant to be suspended in a now missing case. It was also used as a table clock. The complicated works include striking trains for hours and quarters, as well as an alarm mechanism, and the clock's 11 hands not only indicate the hour and necessary waking-up time, but also the date, the position of the Sun and Moon within the Zodiac, the times of sunrise and sunset, and the length of day and night.

Coronation Sword (Danish weapons factory, Broby Works, Funen 1648) King Frederik III's coronation sword, made by the Swede David Kohl, who with the portrait of King Frederik III (1648-70) has made use of a Latin motto actually belonging to the Swedish Queen Christina.

Scanian War Grenadier (Løgismose Manor, Funen, 1675-79) Painted panel from the reign of Frederik V, an ornament and possibly a target. Grenadiers threw hand-grenades and were introduced in Denmark during the war.

Cavalry Helmet (early 1660s) These helmets were used throughout Europe during the Thirty Years' War.

Painting (1600s) An enlisted soldier (lansquenet) and a woman. Painting on glass.

Swedish Medal (1676) Minted to commemorate the Swedish victory at the Battle of Lund, the motif draws on the ancient myth of the Gordian knot and refers to the Swedish army cutting through the Danish lines of defense. They hoped to resolve the issue of sovereignty in Scania.

Victory Medal (1677) Medals were often minted to commemorate major military victories. The medal commemorating the Battle of Køge Bay is the largest and most famous older Danish medal.

Red Silk Waistcoat and Tailcoat with Silver Embroidery (1780s) Presumed to have belonged to President of the Chancellery Frederik Kaas (1758-1827). Frederik Kaas was of noble family and held a number of influential positions in Norway and later Denmark as head of the Danish central administration.

Bourgeois Tailcoat, Waistcoat and Knee-Breeches (1770) Belonged to Lauriz Møller (1743-96).

Brown Frieze Tailcoat with Metal Buttons (Kirkerup Parish in Zealand, late 1700s) The tailcoat belonged to a peasant and was among the peasant's finest attire. The state attempted to regulate the use of expensive fabric through a series of luxury decrees during this time.

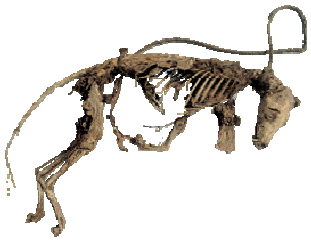
Skull (execution site in Slots-Bjergby near Slagelse) In cases of serious crime the body was drawn and quartered after the execution. The head was speared on an iron spike then mounted on a pole.

Painting of Law Enforcement (1800) A police officer and two watchmen greet a prison guard with a convict in chains. Hard physical labor at Bremerholm or at the royal fortifications was the most common form of punishment.

Spanish Mantle (18th century) Many towns had a wooden barrel convicts had to wear in public for the amusement of the locals and their own humiliation.

Bridal Headdress (1800s) Bridal headdresses and crowns symbolized the bride's virginity. The bride showed her hair for the last time on her wedding day. After the wedding she wore a black bonnet to signal her status as a married woman.

Painting of Madame Bagge and her Husband in the Birth-room (1782) In the 1600s and 1700s women often received visitors whilst lying in childbed. A successful birth was celebrated with food and drink.



Fox Skeleton (Kørbyholm in Funen, 1909) When a cowshed in was demolished, the skeleton of a fox was found hanging from the roof. It was popularly believed that a fox hung in this way could prevent cows from calving prematurely.

Bugle (Gundsømagle near Roskilde, 1738) Used by the master of the village guild to assemble the village guild. In other villages, drums, trumpets or message sticks were used.

Brass Welcome Cup (1848) Inscribed with the saying, 'In the year 1848 the Coppersmith's Guild, as in 1808, donated the guild's silverware to help our beleaguered country'.

Faience 'Bishop' Punchbowl (1735) These punchbowls were the same shape as a bishop's mitre and designed by the St. Kongensade Factory to serve the popular 'bishop' punch of red wine, sugar and bitter oranges.

Blue-decorated Faience Tabletop (1727-49) These tabletops were placed on a wooden tea table and were a major product during the 1700s.

Sugar-cane Machete (1800) Used to harvest sugar cane in the Danish West Indies.

Octant (1870) The octant became standard navigational equipment in the late 1700s and determined the position of the sun on the horizon to calculate the ship's bearings with the time of day.

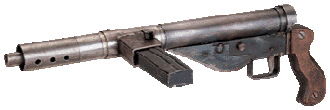
Cutlery (1700) People brought their own cutlery as guests or when traveling. The well-to-do had special traveling sets in a case.

Executioner's Axe This axe was probably used to execute and quarter J.F. Struensee and E. Brandt.

Horn Mug (Paris, 1855) Meerschaum pipe bowl decorated with a scene in which the aging Nordic legendary hero Størkodder begs a warrior to kill him – in vain. Frederik VII purchased the valuable pipe and later gave it to his friend.

Silver Arrow Hairpin (1870-1920) A hairpin in the shape of a silver arrow showed that its bearer was a Grundtvigian. Such silver arrows were highly popular in certain fold high school circles.

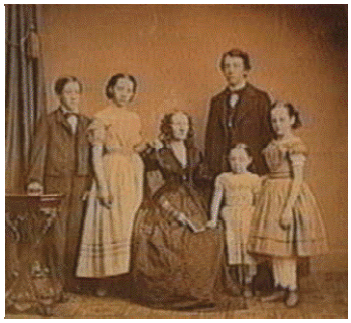
Banner of the Danish Society of Women (1911) The banner was used at national congresses until 1967. In 1915 women carried this banner at the front of the march to thank the king for the vote.



English Sten Gun At the end of 1942, the first acts of sabotage against the German occupying forces were committed. A preferred weapon, most were copies of the original. Different machine shops made different parts of the gun, often without knowing what they were producing. These parts were later assembled at a central workshop, providing the resistance movement with around 500 Sten guns.

Party Dress (1958) As the purchasing power of the young increased, fashion for the new market emerged. The jitterbug and rock 'n' roll became popular among the young.

Redstockings Poster (1984) The new women's movement was part of the youth movement and started in 1970 with the Redstockings' first demonstration. The Redstockings campaigned for social change under the banner 'No women's liberation without class liberation – no class liberation without women's liberation'.



Family Portrait

Town Painting

Hangman's Plate

Yellow Dress

White Dress with Berries

Retro Male Outfit

White Dress with Train

Religious Cross

Blue Dress with Pink Sash

Glass Ball

Appendix G: Actionscript Code for Flash 8

The following are examples of the code used in our project. The code for items is simplified here giving one example of the code for 1 item. To get an idea of the amount of code used in our project, multiply each line by 50.

Drag and Drop Code with Sound:

```
this.invis.onPress = function() {
        invis.startDrag();
        pick.attachSound("Click");
        pick.start();
};
this.invis.onRelease = function() {
        stopDrag();
```

Item Creation Code and Visibility Settings:

```
onEnterFrame = function () {
        invis._visible = false;
this.objectbox.onPress = function() {
        if (yuppers._currentframe == 1) {
                up.attachSound("open");
                up.start();
                yuppers.gotoAndPlay(2);
```

Trash Can Hit Test Code:

```
if (this.hitTest(trashcan)) {
                trashsound.attachSound("recycle");
                trashsound.start();
                this._visible = false;
```

Object Descriptions Code:

```
this.objectbox.onPress = function() {
        if (yuppers._currentframe == 1) {
                up.attachSound("open");
                up.start();
                yuppers.gotoAndPlay(2);
```

Premade Descriptions Code:

```
this.skull_mc.onRollOver = function () {
        if (premadeinfo._currentframe == 90) {
                premadeinfo.gotoAndStop(92)}}
```

Loading Screen Code:

```
if (_root._framesloaded == _root._totalframes) {
        gotoAndPlay("Main", 1);}
framesLoaded = _level0._framesloaded;
```

```
totalFrames = _level0._totalframes;
percentloaded = Math.round ((framesLoaded/totalFrames)*100 );
bar._xscale = percentloaded;
```

Plaque Code:

```
this.onEnterFrame = function() {
	_root.plaquetxt2._x = this._x;
	_root.plaquetxt2._y = this._y;
	_root.pmenu2._x = this._x
	_root.pmenu2._y = this._y + 30
	if (this._visible == false) {
		_root.plaquetxt2._visible = false;
		_root.pmenu2._visible = false;
	} else {
		_root.plaquetxt2._visible = true;
	}
};
stop();
pstyle.onPress = function(){
	_root.plaque1.nextFrame();
}
pfont.onPress = function(){
	_root.plaquetxt1.nextFrame();
}
paccept.onPress = function(){
	_root.pmenu1._visible = false
}
```

Appendix H: Project Evaluation and Maintenance Instructions

The Danish National Museum hosted a WPI project group in the spring of 2007 to increase the attendance of young people ages fourteen to thirty-five at the Danish National Museum. Below is a summary of the advantages and difficulties discovered during the project team's experiences throughout the seven weeks. We developed a website using Adobe Flash 8 that would encourage young adult museum attendance.

During the first week of the project, Charlotte Jensen, our contact at the Danish National Museum, set up a series of meetings that introduced museum advertising to our project group. These meetings gave us a sense of what type of project would be developed. We learned useful information, such as the limited budget, how to obtain photographs, and the museum's recent attendance.

Charlotte Jensen was our contact with the Danish National Museum throughout the entirety of the marketing project. The team met with Charlotte Jensen and our advisor, John Zeugner, on a weekly basis to discuss the direction that should be taken with the Virtual Exhibit. The meetings provided us with the opportunity to critically analyze the exhibit website and gave us a direction for the upcoming week. Generally, we would leave the meeting with a list of improvements that would develop the website into a user-friendly activity.

Many individuals provided assistance throughout our seven weeks in Copenhagen. The assistance from individuals at the Danish National Museum was integral to the completion of the project. Charlotte Jensen's time and assistance was crucial because it gave us an opportunity to fully understand the expectations of the museum. The data gathered by the museum helped us better understand the needs and goals at the current time. The fact that our group would access museum documents and photography allowed for us to present a project that can be implemented

on a website. Our workspace was provided for by the Engineering College in Bellerup and gave us a room to utilize throughout the week. Lastly, many outside contacts helped us fix problems we encountered while using Flash 8 and PHP.

The assistance that our group received was both appreciated and necessary to the final presentation. However, there are a few suggestions we would make for future projects. A more detailed project description from the Danish National Museum would help a future project group come to Copenhagen better prepared to tackle the project. Perhaps specific needs and restrictions could be addressed early on. Perhaps some sort of online meeting before starting the background research would have helped to focus our project more in the correct direction then it originally was. It is also worth mentioning that at the onset of the project it was very hard to communicate with individuals at the museum due to a harsh spam filter on their email server. It would also be useful for the team members to learn any necessary computer skills while still at WPI. The final product would be developed much more if this were the case. Finally, the Engineering College failed to provide the group with access to a printer. This wasn't detrimental to our work, but it would have proven to be useful at certain times.

We have thoroughly enjoyed working with both the museum and with Charlotte. We hope that the museum will continue to work with WPI through the IQP exchange process and possibly even consider hosting an MQP site. Please let us know how the website works and feel free to contact us in the future.

Summary

Pros

- IHK – workspace
- DNM – Charlotte's time and assistance, data collection, access to exhibit information, museum background information

- Project – outside contacts with Flash knowledge helped greatly

Cons

- IHK – only 2 internet connections, no computer or printer
- DNM – more detailed project description before arrival at Copenhagen, specific outline of resources available
- Project – research and learn methods of web creation prior to departure from WPI

Recommendations for Maintaining and Updating the Website

WEBSPACE: The website itself, once it is up and running should not need any more assistance other than a weekly cleanup process. In this cleanup process one would simply have to delete all the .txt files from the server that were created over the past week in order to save space. If the size of these files is not a significant issue to the server then a monthly or even yearly cleaning could be substituted. .txt files are usually relatively small (on the order of 100 bytes or so) so if one purchases say a 100 MB web space and 10 of those MB are used for the Flash files, that's around 90,000 .txt files that could theoretically be stored before a cleanup process would be required.

SERVER (Flash)- The server itself has to be able to support Flash 8 or 9 Player as well as Actionscript 2.0 in order to host the Flash document. The documents that need to be uploaded are the .swf main file which has to be coded into the webpage, along with the .swf background music file. The inclusion of these 2 file's will set up the first stages of the online exhibit.

SERVER (PHP): In order to save and share one's Virtual Exhibit the server where it is hosted must support PHP applications. Along with the main .swf file a separate reader .swf file must be uploaded that can take the .txt documents and compile them to show the customized exhibit.

Updating The Files: In order to add new sound effects, pictures, or other components that one may wish to include within the exhibit Flash 8 must be used. Included on the CD is a file called VirtualExhibit.fla. A .fla file is the entire Flash creation document for a specific movie. This file contains everything that we used to make our Virtual Exhibit, and adding new pictures is a rather simple process. All one would need to do is open a Flash movie clip in the library called object bank. Inside this movie clip are all the pictures and descriptions of them. One can either replace a picture with a new one, or insert new frames into the movie clip. In the main scene there are codes which reference the visibility, drag-ability, and insertion process of each object. A basic understanding of Flash would be required in order to update these codes, however we are confident that after a few days of learning it will be easily accessible to just about anyone. You don't necessarily have to even understand the code, just replacing the instance name with the new objects name, along with its frame number in the object bank movie clip will accomplish this task.

Recommendations: If the museum wishes to continue hosting and updating the website we strongly suggest either licensing it out to a private company or hiring someone with Flash and/or PHP experience, as they will most likely be able to understand and improve upon our original concept.