Developing a Corporate Teambuilding Program Using Location-Based Information Technology at the Danish Open Air Museum

An Interactive Qualifying Project Proposal
Submitted to the faculty of
Worcester Polytechnic Institute
In partial fulfillment of the requirements for the
Degree of Bachelor of Science

Submitted by:

Jeremy Chapman
Krista Dietz
Peter Perreault

Submitted to:

Project Advisor:

Prof. Peter Christopher

Project Liaisons:

Klaus Jensen, Danish National Museum
Rikke Ruhe, Danish National Museum

May 2nd, 2008
teambuilding@wpi.edu

Abstract

This project was to develop a teambuilding program for Frilandsmuseet, the Danish Open Air Museum, located in Lyngby, Denmark in order to attract businesses to the museum. By combining cutting-edge location-based information technology with the unique setting of the museum, we created an interactive teambuilding game that allows visitors to have an enjoyable day with their co-workers while learning about Danish history and, simultaneously, enhancing their team dynamics.

Acknowledgements

This project could not have been completed without the constant attention, resources, and advice of Klaus Jensen, an Information Technology Professional at the Danish National Museum, as well as Rikke Ruhe, a museum curator at the Open Air Museum. They made it possible for us to become acquainted with Frilandsmuseet and its grounds, while teaching us about the history of the museum, showing us the "Land of Possibilities" game, and helping us explore possible games for our program, among other invaluable services.

We would also like to thank Anja Jørgensen and Annemarie Vieth, two Frilandsmuseet employees in charge of museum activities, for providing us with information about programs that are currently offered at the museum for people of all ages. Both Anja and Annemarie were incredibly helpful in giving us great ideas for our game. Their point of view offered valuable insight into possibilities that we had not initially considered. Our thanks also go to Dr. Mikkel Pedersen, a historian at Frilandsmuseet, for kindly providing us with office space in his library at the museum and being a great source of information on Danish history and culture.

Finally, we would like to thank Director Tom Thomsen and Professor Peder Pederson at Worcester Polytechnic Institute for preparing us for our trip and project in Denmark. We would like to provide a special thanks to our project advisor, Professor Peter Christopher, the most outstanding teacher of the year at WPI, who gave us consistent advice and direction during the execution of our project and our experience in Copenhagen, Denmark.

Executive Summary

The Open Air Museum, known to the Danes as Frilandsmuseet, is a living history museum which depicts the life of Denmark in the eighteenth and nineteenth centuries. Located in Lyngby, Denmark, the museum sits on eighty-six acres of land and consists of many farms, mills, and houses that were preserved and maintained from the mid seventeenth century to the mid twentieth century. The museum offers a variety of activities for people of all ages, including baking, theatrical performances, folk dancing, and old-fashioned games. The museum attracts classes of schoolchildren, families, tourists, as well as neighbors who simply take their dog for a walk. Even though there is a large range of activities at the museum for people young and old, the management staff at Frilandsmuseet is interested in attracting more businesses and large corporate organizations by offering a teambuilding program.

The goal of this project was to create a teambuilding game which can be implemented into a location-based mobile information system called LifePilot. Frilandsmuseet wanted to develop a program where companies could use mobile phones with positioning capability and LifePilot software to navigate around the museum, learn about Danish culture, and develop strong team dynamics which they can take back to the workplace. Our adventure game combines the museum's history with a fictitious story, and challenges participants to interact with their teammates in order to solve a common task.

After considering and analyzing many different program options, we were able to develop a prototype of a scavenger hunt style adventure game in which employees split into groups and use the fundamental elements of teambuilding, along with a LifePilot-equipped mobile phone, to search for various physical and virtual objects around the museum. The objects they collect and information they gain help them to prepare a nineteenth century-style festival. As participants search for items to prepare for the party, such as butter and coffee, they encounter certain challenges and obstacles where they will have to make choices, communicate with other groups, and cope with changes in events. Once the groups finish collecting the objects, they must meet back at a common location

and use what they learned to help one another assemble those objects into the tools and ingredients necessary for preparing the festival.

Our prototype consists of a detailed layout of the game for two specific groups: the group that prepares the butter for the festival and the group that prepares the coffee. We developed a detailed script and map for each team, which depicts the layout of all the location points each team could visit, and what was said at each point. With these tools we were able to test our program without the mobile phones and software to determine if there were any major flaws in our game, and to accommodate for any variation in time or distance. With limited time, we were unable to implement the program into the LifePilot system; however this is the next step the museum staff must take in order to further test our program.

We provided the museum with detailed recommendations for further development of the program, including ideas for other groups, along with additional teambuilding challenges and obstacles that can be incorporated into future editions of the program. While examining the mobile phones and platform, we discovered that improvements to the LifePilot software could allow further enrichment to our program.

The completion of this program will benefit Frilandsmuseet by attracting a new audience and generating revenue. At the same time, developing this program will allow companies to step away from their workplace and experience an enjoyable day with their co-workers where they can work together as a team, communicating, listening, making group decisions, and coping with changes. All of these are essential elements of an effective teambuilding program.

Table of Contents

Abstract ..... **i**

Acknowledgements ..... **ii**

Executive Summary ..... **iii**

Chapter 1: Introduction **1**

Chapter 2: Background **3**

2.1 Importance of Museums: Culture and Heritage 3
2.1.1 The Museum Experience – Individual and Social 4
2.1.2 Open Air Museums 5

2.2 Frilandsmuseet in Lyngby, Denmark 5
2.2.1 Goals of the Museum 7

2. 3 Corporate Teambuilding 8
2.3.1 What is Teambuilding? 9
2.3.2 What Makes a Good Team? 11

2.4 Techniques for Teambuilding with Interactive Media 18
2.4.1 LifePilot Software 18

Chapter 3: Methodology **21**

3.1 Learning about Frilandsmuseet 21

3.2 Developing a Program Prototype 24

3.3 Testing the Program 27

Chapter 4: Results and Analysis **29**

4.1 Program Concept 29

4.2 The Game 34

4.3 Initial Test 36

4.4 Final Test with Museum Employees 38

Chapter 5: Conclusions **41**

5.1 Special Features 42

5.2 Finances 43

5.3 Project Success 43

Chapter 6: Recommendations **45**

6.1 New LifePilot Features 45

6.2 Improvements to the Program 46

References **49**

Appendix A: Teambuilding Game Script 53

Appendix B: POI Layout 61

Appendix C: Map of Key Program Locations 62

Appendix D: Maps of POIs for Both Stories 63

Appendix E: Miniature Games 64

Appendix F: Land of Possibilities Survey Summary 66

Appendix G: Finances 68

Appendix H: Interview Questions 69

List of Figures

Figure 1: Frilandsmuseet Entrance 6
Figure 2: The Manor House at Frilandsmuseet..... 6
Figure 3: Sphere of Knowledge 15
Figure 4: A mobile phone and GPS receiver playing Mulighedernes Land. 19
Figure 5: Mobile phones and GPS receivers before running “Land of Possibilities”. 24
Figure 6: A Cow in the Butter Churning Mini-game..... 64
Figure 7: Vegetable in the Coffee Group's Mini-game..... 65

Chapter 1: Introduction

Although teamwork has become an essential aspect for unifying many companies, it is not always easy for teams in a company to work productively. Many factors can hinder good team dynamics; for example, members can disagree on how to solve problems or how to tackle a task. Through a lack of communication they can become misguided, unmotivated, or confused, which hinders their ability to accomplish tasks (Newstrom and Scannel, 1998). Although working in teams can be difficult, teams should be the basic unit of performance for most organizations. While individuals tend to operate within confined job roles and responsibilities, a team usually gets better results because of its combination of multiple skills, experiences, and judgments (Katzenbach, 1993). Teams are more productive when they can identify with one another and see themselves as a team in order to achieve a common goal (Hayes 1997).

To promote better teamwork and synergy in the workplace, companies can provide their employees with opportunities for teambuilding. Teambuilding helps develop a strong sense of belonging on a team, and teambuilding activities allow employees to interact both inside and outside of the workplace in order to gain skills that will help them work together successfully. Teambuilding activities can be as simple as a day of hiking through a forest, or they can be more complex and structured, requiring a facilitator who organizes specific exercises that target the important characteristics of a successful team. While some teambuilding programs can be done at the workplace, holding the activity at this location can sometimes be an ineffective way to build group dynamics because the employees are surrounded by a familiar atmosphere that reminds them of their remaining work. By stepping outside of the office into a new atmosphere, employees can forget about their busy lives, relax their minds, and focus their full attention on new stimuli and activities.

Frilandsmuseet in Lyngby, Denmark is a large, outdoor collection of historical buildings that reflects Danish society of the past. The museum is offering its unique location, as well as its available technology to companies that seek to promote teambuilding. The museum currently uses mobile phones with a mapping program and handheld Global Positioning System (GPS) receivers for an interactive game to teach

Danish schoolchildren about life in the 1800s. They would like to expand the use of this technology to help aid businesses with teambuilding. Similar programs have already been developed in the United States, such as the Boston University Sargent Center's GPS Urban Adventure program, which is offered to young adults and companies (Boston University, 2008). Frilandsmuseet would like to create a program where companies can use mobile phones with mapping software and a GPS to navigate around the museum, learn about Danish culture, and develop strong team dynamics which they can take back to the workplace. This would not only bring in more revenue to the museum, but would also help market the museum by word-of-mouth to the companies' families and friends. By creating a teambuilding program at the museum, group members would build trust and communication skills, learn to take risks as a team, and develop plans for setting and reaching goals.

To help the museum attract a wider audience, we worked with the museum staff and our sponsor to develop an adult group adventure program. We familiarized ourselves with the museum atmosphere, observed museum visitors, learned about current museum activities, became proficient with using the GPS-equipped mobile phones, and interviewed museum employees in order to determine what factors must be considered when designing the program. We determined through user-tests which aspects of our proposed group adventure program best promote healthy interaction and teamwork. The project culminated in a teambuilding adventure program and story that could be implemented into the LifePilot software.

Chapter 2: Background

In this chapter we focus on two topics: the role of museums in society, and the role of teamwork in the workplace. We discuss the educational and social experiences that museums provide, and we describe how teambuilding activities might enhance the museum experience. We then explore the importance of teamwork in the workplace and examine the key elements of creating a teambuilding program for businesses. Having presented key teambuilding strategies, we explain how the use of location-based information technology can create a unique opportunity for business workers to refine their ability to work effectively as a team to achieve a common goal. In particular we describe how these elements might be used with mobile phones, mapping software, and a GPS receiver to develop a teambuilding game at Frilandsmuseet.

2.1 Importance of Museums: Culture and Heritage

Most people consider a museum to be a collection of historically and culturally significant objects; however this description does not capture the true essence of a museum. A collection of objects is important only if members of society are active observers who learn about the relevance of these objects to the world around them. A museum would serve no purpose if it just collected objects that had no meaning to our daily lives. The ultimate purpose of all museums is to educate society and provide museum visitors with an enjoyable experience, either as individuals or with friends and family. To fulfill this purpose, museums are obligated to maintain an environment that is conducive to learning, whether the subject is cultural heritage, history, science or art (Malaro, 1994).

In order to fully understand the services that museums provide to society, it is important to consider the types of experiences museums can offer to its visitors. The International Council of Museums defines a museum as “a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and

enjoyment" (ICOM, 2007). The end of this quote defines the purposes of a museum – for "education, study, and enjoyment." Ideally, a museum provides opportunity for individual growth in education and the opportunity for an enjoyable social experience.

2.1.1 The Museum Experience – Individual and Social

Museums can provide unique educational experiences by maintaining a learning environment. While traditional centers for learning, such as schools or libraries, involve spreading information through lectures or reading, a museum can teach visitors about information, history, and culture through the display of objects. A museum creates unique sensory experiences with two and three dimensional objects which transcend the information that can be gained by listening or reading (Kotler, 1998).

Sensory experiences allow a visitor to leave a museum with a different kind of understanding of culture, heritage, or any other information the museum has to offer. By walking through exhibits, a museum visitor does not just see objects, but rather learns about past events or ideas, and allows him or her to relate these events to their every-day life. According to Falk and Dierking, "Museum visitors do not catalogue visual memories of objects and labels in academic, conceptual schemes, but assimilate events and observations in mental categories of personal significance and character, determined by events in their lives before and after the museum visit" (2002, p.123).

Museums also offer a social experience, where the visitor goes to a museum to be with friends or family. Visitors who attend the museum in groups often leave with a better understanding of the interests of their peers, colleagues, or family members (Anderson, 2004). The social experience is an important factor to consider when designing exhibits, and successful museums will design an experience that can be appreciated by families, large groups of students, or groups of friends in order to attract a more diverse section of society (Kotler, 1998). For example, museums often try to appeal to families and communities by designing holiday celebrations, ethnic heritage events, and family oriented exhibits in order to attract a wider range of visitors (Kotler, 1998).

2.1.2 Open Air Museums

An open air museum, which typically has outdoor exhibits, is one type of museum that can attract large groups of people through the interaction with its surroundings. People are more likely to travel to this type of museum in groups, because its specific size and setting is inviting to larger groups of people (Paris, 2002). One category of such museums often features the preservation of buildings or architecture of a particular time period. Open air museums try to incorporate both individual and social experiences in one interactive environment. By being immersed in a different historical setting, visitors are likely to learn about their surroundings through interaction and the use of all of their senses. Open air museums may also be considered a living history museum if they involve re-enactments of that time period. Old Sturbridge Village is a living history museum in Sturbridge, Massachusetts that replicates a New England town from the 1830s with forty original restored buildings from that time period (Old Sturbridge Village, 2007). Living history museums originally began in Scandinavia (including Denmark) towards the end of the nineteenth century, and their popularity has quickly spread throughout the rest of the world (Magelssen, 1974).

2.2 Frilandsmuseet in Lyngby, Denmark

Frilandsmuseet in Lyngby, Denmark is another example of a living history museum, which depicts life in Denmark in the eighteenth and nineteenth centuries. Known to the Danes as *Frilandsmuseet*, the entrance to which is shown in Figure 1, it is the largest museum of its kind in Denmark and one of the largest and oldest in the world (*Nationalmuseet*). The museum currently sits on eighty-six acres of land with more than fifty farms, mills, and houses that were preserved and maintained from the mid seventeenth century to the mid twentieth century.

Figure 1: Frilandsmuseet Entrance

The museum was founded in 1897 and moved to its current location in 1901 (*Nationalmuseet*). It offers a variety of experiences for its diverse visitor population. There are live demonstrations of the mills, gardens, and farm animals, as well as a café, a restaurant, and a store. Visitors include classes of grade school students, senior citizens, families, and even neighbors who take advantage of its large open space as a place to walk their dogs. The peaceful and serene landscape in the museum, which can be seen in Figure 2, makes the museum a welcoming environment for many visitors.

Figure 2: The Manor House at Frilandsmuseet

2.2.1 Goals of the Museum

The main goal of Frilandsmuseet is to represent the way of life at the time of Hans Christian Andersen so that visitors can experience past Danish culture firsthand. A continuing goal of the museum is to attract larger audiences, although it does not struggle with attendance due in part to its free admission (*Nationalmuseet*). Government funded, the museum's loyalties are to the tax-paying community of Denmark, and so it perpetually seeks to adapt and evolve to the needs and requests of the Danes.

In order to appeal to wider audiences, Frilandsmuseet develops new programs. During the off-season from October to March, a group of museum planners, called *Frilandsmuseet Venner*, also known as 'Friends of Frilandsmuseet', form strategies for new innovative programs, demonstrations, and purchases of additional buildings (*Nationalmuseet*).

One relatively new program is called "*Mulighedernes Land*" (meaning "Land of Possibilities"). It is an interactive, story-based adventure that takes young participants all over the museum, making innovative use of mobile phone-GPS technology. *Mulighedernes Land* is a program that combines history, role play, and the vast area of the museum into a life-sized interactive adventure. Participants in small groups are challenged to get their virtual nineteenth century character to succeed in life by gaining certain status points as they travel around the museum. Each character has a unique story and a task to complete. Characters are initially given a fixed amount of virtual knowledge, social skills, and money. In order to accomplish their task, they need to gain points in these areas by listening to virtual characters and traversing the museum. At different locations which are marked on their phone, referred to as points of interest (POIs), they encounter virtual characters that give them clues in the form of audio and pictures that may help them solve their task. Not everyone is helpful, so they have to listen carefully to the character in order to know where they need to go. This program challenges children to make quick group decisions as they learn about life in Denmark in the period of 1880-1900. The game has been beneficial for the museum, as many groups of people of all ages have come to play at a fixed, group price. Additionally, other groups of people of all

ages have come to the museum to play the game, lured by the opportunity to try out the new technology.

This year, the museum wants to develop a teambuilding program specifically for businesses and using the museum's GPS-equipped mobile phones. The goal of this project is to attract businesses to the museum by combining its history-rich setting with modern technology to form a teambuilding program catered to business workers. The aim of our project is to help the museum reach this goal by designing an enjoyable adult adventure program that promotes teamwork and learning. The program is designed to use GPS technology to take participants around the museum and provide location-based information that will guide them through the adventure. The program must also be customizable so it can accommodate various sizes of groups and apply to specific interests or needs.

2. 3 Corporate Teambuilding

Teambuilding, a strategy to facilitate team development, can be designed to serve many different purposes. It can be used to enhance relationships and friendships among a group or organization, increase open communication and listening, sharpen problem solving skills, develop trust within a group, and allow everyone to have some fun (Miller, 2004). It is crucial for employees of certain businesses to develop these teamwork skills in order to work diligently and successfully in the workplace (Welch, 2005).

In order to develop a good teambuilding program for businesses to use at Frilandsmuseet, it is important to determine which teamwork attributes are essential for a company to be successful. Many activities in organizations require more than one person to complete a task. One obvious example is a company project such as the development of a product. In this case and in others, people with different skills have to get together and pool their ideas. More ideas will then be discussed and improved. Jack Welch, a retired chief executive officer of General Electric, believes that "any organization, unit or team, that brings more people and their minds into [a] conversation has an immediate advantage" to being a successful team (2005, p.140).

Many businesses offer team–building programs to their employees to have them learn how to work well in teams, while other companies have their own ways of teaching the principles of teamwork. No matter how businesses are managed, most of them understand the need to teach their employees about cooperation, communication, and problem solving (Archambeau, 2006). Even if business men and women are intelligent and skilled, "effective teams do not just happen …there are certain characteristics that all teams must have before they can successfully exercise these skills" (these specific characteristics will be discussed in the next sections) (Carr, 1992). Teambuilding activities and games can play a vital role in the process of building teamwork, by understanding a team's developmental stages, noting certain factors for their success, and exploring the broad range of team leader behaviors that can help their performance (Newstrom and Scannel, 1998).

2.3.1 What is Teambuilding?

When the word "teambuilding" is mentioned some familiar activities might come to mind. Some well-known teambuilding activities include completing a ropes course; constructing a complex object; playing "The Name Game," an introductory game where people learn clever ways to remember other people's names; or simply completing the "Trust Fall" exercise, where the participant must close their eyes and lean back, trusting that their partners will catch them. Although these are very common activities that promote teamwork, the act of *teambuilding* involves more in meaning and substance.

Teambuilding is not strictly for children and teenagers. Stanley Pollack, a founder of Boston's Center for Teen Empowerment, developed innovative methods for engaging youth in a process of creating positive changes in their communities. He believes that "most principles and practices that are effective in engaging teens in important work are also effective with adults" (Pollack, 2005, p76). He claims that both the young and old want to be heard, to feel valued, and to have meaningful input in the decisions that affect their professional and personal lives. Both the young and old also need a sense of community in order to feel connected with the people around them in more than

superficial ways. Teambuilding activities can be one approach to bring teammates together (Pollack, 2005).

Even though people of all ages want to work well with their team or organization, the specific teambuilding activities must cater to the corresponding age-group. For instance, teambuilding for children might be more geared towards developing closer friendships and getting to know one another, and teambuilding for adults might be more geared towards improving team relationships, communication, and decision making (Pollack, 2005). In the workplace, people often get caught up with their workload and focus most of their attention on accomplishing tasks. This tends to hinder employees from having open relationships with each other (Carr, 1992). Corporate teambuilding is one way to remind employees of their community, and it allows them to feel more comfortable around one another (Pollack, 2005).

A teambuilding experience encourages participants to observe how they and others work and interact in groups. It involves determining ideal ways of collaborating; exploring the gaps and weaknesses they currently suffer from as individuals, and as a team; and establishing action plans for improvement in the future in order to implement more effective ways of cooperating together as a team (Newstrom and Scannell, 1998). Journalists W. French and C. Bell believe a teambuilding program uses three tactics:

> "First, the program may have a task focus that examines the team's problems and attempts to develop solutions to them. Second, it may take a group process or relationship focus, using exercises and activities to improve how the group operates and the interpersonal relationships among team members. Third, it may take a structural approach and develop new norms, rules, and procedures to improve the team's operation" (1984).

Although creating high-performance teams can be challenging, corporate teambuilding is a step in the right direction because it brings groups of employees together, takes them outside the workplace, and teaches them how they currently work together and share ideas. This allows them to improve their individual work ethic, as well as their teamwork ethic for the future.

2.3.2 What Makes a Good Team?

Teambuilding programs and exercises can serve different purposes. While some may focus on communication and listening, others may focus on leadership. In order to know what types of activities will benefit businesses, it is first crucial to determine what characterizes a successful team. The important qualities necessary for a group of employees to work together will help us structure teambuilding activities that aim to strengthen these qualities. The following sections will describe some of the important characteristics of a good team: cooperation and attitude, communication and listening, problem solving and decision making, coping with change, and trust (Carr, 1992; Levi, 2007).

Cooperation and Attitude

When a team runs smoothly, members can concentrate on their primary goal of improving a process or addressing a problem, while a team that fails to build relationships among its members will waste time and energy on struggles for control and endless discussions that lead nowhere (Scholtes, 1988). Working in groups can create problems such as power struggles, feuds, jealousies, and wasted time; however, most people prefer to work with others instead of working by themselves. This preference to work in teams can also be a problem due to an inefficiency of accomplishing tasks simply because the people on the team like working together (Carr, 1992).

In the corporate world, however, it is rare that an individual has enough knowledge or experience to understand everything that goes on in a process. Therefore, it is essential to receive the proper training so that teams can work well together to tackle complex problems and come up with effective, permanent solutions (Scholtes, 1988). Welch proclaims that it is essential to work in teams even though "some people have better ideas than others [and] some are smarter or more experienced or more creative [than others]…Everyone should be heard and respected" in order to pool everyone's thoughts and ideas together (2005, p.57).

Carr explains that it is possible to have seven people work on a customer complaint and consequently seven people respond to the customer. But he believes that no one really takes responsibility for the final product when everyone is working

individually on the same task, and if a product gets transported from one station to another, it gets delayed (1992). And, if the final presentation or project is overdue, the project manager might not be happy. Instead of having multiple people work on the same task individually, it is more efficient to have them work together from the beginning. This will allow the initial task to be accomplished faster and it also allows for the integration of many different thoughts and ideas. Cooperating in a group allows for many tasks to be accomplished efficiently and on time.

These tasks are accomplished through goals. When cooperating, people are acting to help promote the group and its goals. Without unified group goals, people work individually and act on their own, which results in a lack of communication (Tyler and Blader, 2000). By interacting with one another, everyone can participate in discussions and decisions, share commitment to the project's success, and contribute all of their talents, skills, and resources. Sharing and comparing ideas and talents within a group will help develop a more comprehensive and thorough outcome of a particular job, task, or decision (West, 2004). By uniting as one entity and cooperating together in a teambuilding activity, employees will encounter situations that will require everyone to question others' thoughts and ideas in order to determine the best solution to a problem. Being in a situation where people have to work together and make decisions in order to accomplish a teambuilding task might help people gain more confidence in themselves, maintain a positive attitude and open mind, and openly communicate.

If people refrain from sharing their thoughts and ideas with the rest of the group, failure can result due to illogical choices (Anderson and Taylor, 2006). Groupthink is a strategy where group members have a tendency to try to minimize conflict and reach a consensus opinion without critically testing, analyzing, and evaluating ideas. This can be due to shy individuals who want to avoid embarrassment or angering other group members. When an individual's doubts are set aside because of fear of upsetting a group's idea, irrational decisions can be made (Anderson and Taylor, 2006). "Groupthink is not inevitable when a team gathers to make a decision but it is common and appears in all sorts of groups from student discussion groups to the highest councils of power" (2006, p.149).

Team training and teambuilding can help people avoid or overcome these kinds of problems. It is possible to change a person's behavior without changing his or her perceptions. In a teambuilding exercise, idea generation takes priority, allowing everyone to participate without being judged. In these activities it is encouraged to have a diversity of viewpoints (King, 1996). The facilitator of the teambuilding activity can ask questions that encourage everyone to listen to other's ideas, and push the team members to look at a problem from many different ways. This stimulates a discussion where everyone is participating, and rational decisions can be made (King, 1996).

Communication and Listening

In order for business groups to collaborate, they must learn to openly communicate and actively listen. Good discussions depend on how well information is passed between team members. According to author Daniel Levi, "Successful teams perform the following actions: performance monitoring, feedback, closed-loop communication, and backing-up behaviors" (2007, pg 94). Corporate team members must observe the performance of other members and help out when needed. It is also important to have a debriefing session where all members have the opportunity to give feedback to one another in order to improve performance. Internal communication allows for everyone to make sure they understand the meaning of their team goals, and in the end everyone must back each other up. A team is a cohesive group of people that is always there to support one another (Levi, 2007).

In order for corporate team members to be supportive, they must take turns being the leader, as well as the listener. It is important to share ideas, but it is just as important to hear everyone else's ideas. Clear communication and well thought-out decisions occur through exploring, rather than debating each other's ideas (Scholtes, 1988). The act of participating through speaking and listening leads to mutual understanding. Everyone has seen problems occur because of a lack of communication, usually caused by a difference between what the listener hears and the speaker intends (King, 1996). By speaking directly and with clarity, being succinct, listening actively, avoiding interrupting while others are speaking, and sharing skills, talents, and information clearly, an atmosphere of

open communication and respectful integrity will reign, and the group will develop mutual understanding (Scholtes, 1988).

Problem Solving and Decision Making

With communication and listening skills, groups of employees are better able to collaboratively and civilly make decisions and solve problems. Decision making and problem solving are two important aspects of working together. In the workplace, there is not always a right or wrong answer. People must decide *how* they want to design something or *how* they want to market a product. Although some studies have indicated that an individual working alone is a more productive thinker than a group when it comes to problem solving, a team decision tends to be more practical because it is a decision influenced by more than one person (King, 1996).

Another argument in favor of teamwork involves the acceptance of decisions that are made. "While an individual might do better, technically speaking, in some circumstances, having a good solution to a problem is far different from having it accepted. Consequently, the acceptance of a decision by the individuals involved is often as important as the quality of the decision" (King, 1996, p.19). If a decision is made without the consensus of particular team members, they could feel alienated and distant from the group. By sharing one's opinions and ideas with the group, members are able to collaborate all of their ideas and knowledge to come up with a solution, which is a combined effort (King, 1996).

In order to demonstrate how individuals must pool their ideas in order to maximize knowledge, T.R. King, author of *Teams and Techniques for World Class Improvement*, introduces a concept called The Sphere of Knowledge, as shown in Figure 3. The concept is based on a series of intersecting circles. Each circle has some shared common space and some private space that it occupies. This is analogous to individuals on a team. There will always be some common knowledge shared by some people, and some information that each person alone only knows. The middle shaded area represents knowledge common to all members, the lightly shaded area represents the knowledge that each individual alone knows. The remaining areas that are not shaded are common knowledge to two or more team members. This shows that all members are important to a

team: “one piece of data or input needed to solve a problem could be unique to a certain individual” (King, 1996).

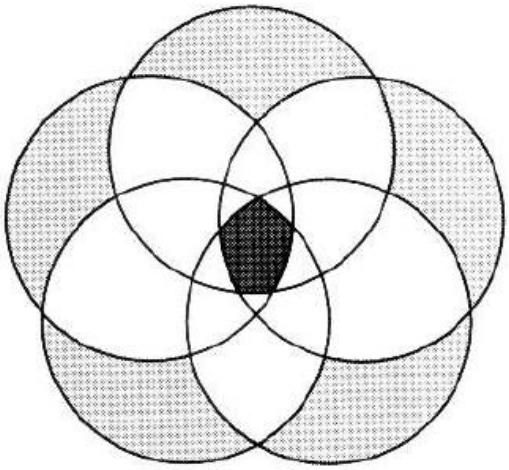


Figure 3: Sphere of Knowledge
This is a Venn diagram which represents individuals working on a team. Each individual is knowledgeable in certain areas, and combining their knowledge with members of their team can help develop a more thorough solution to a problem.

By using this Sphere of Knowledge as a guideline, and having every team member contribute to a decision, or problem solving process, a solution to a problem will be more solid and diverse because these groups of individuals are coming together to combine their efforts, knowledge, and skills to achieve shared goals (West, 2004).

Group decision making also has motivational effects on group members because being part of a group encourages members to try to make good decisions and perform better. Members benefit by gaining a better understanding of issues by participating in discussion. Through teambuilding activities, businesses can work together outside of their typical business setting, in order to develop these decision making skills and learn from one another. Building these qualities for a team can then be applied back in the workplace (Levi, 2007).

Coping with Change

Problems occur when organizations around the world find themselves in socio-economic environments where the demands of consumers are constantly changing. People require new and different commodities and services to meet the needs of the

developing society in which they live. Organizations are constantly developing with new, more complex computers, technology and other services, and it is therefore essential for individuals to adapt to these changing environments and any specific issues that may arise (West, 2004).

Change can bring opportunity and can often help people achieve their goals, not be a barrier to them. While fight and flight are natural reactions when dealing with change, it is sometimes important to avoid these reactions and learn how to adapt to changes (Singleton, 2006). Change allows people to grow as human beings, and it is therefore important to learn how to cope with change. In the business world, there is no guarantee that everything will work out perfectly. Employees must develop the confidence to know that even when change seems to create problems, they can find ways to overcome these problems, or at least cope with them. A teambuilding activity can help a group find creative ways to overcome adversity and succeed in new directions.

Trust

The most effective requirement for a team to communicate well, make decisions, solve problems, and overcome adversity is common trust, one of the most important components of a successful team. Although many other factors are involved, such as communication skills and decisiveness, "nothing – *nothing* – impacts [a team's relationship] more than the ability…to create and maintain trust" (Carr, 1992, p.190). Without a high degree of trust, a group in an organization simply cannot function (Carr, 1992).

Trust is not something that is acquired automatically, and it usually takes some time and patience for team members to learn to trust one another. When people are not used to trusting others, they become skeptical and suspicious of everyone else's actions. They may want to trust each other, but they will not until others have proven themselves worthy. Sometimes it takes time to feel comfortable with your group mates, so that patience is crucial for creating and maintaining trust (Carr, 1992).

When trust exists in an organization or business, relationships grow stronger and most jobs or tasks are easier and more comfortable to achieve. Trust is considered the basis for much of the environment that people want to create in the workplace. It is about

feeling able to rely upon others, cooperating and experiencing teamwork with a group, taking risks, and clearly communicating. Heathfield, author of an article entitled *Trust Rules: The Most Important Secret About Trust*, states that "The best way to maintain a trusting work environment is to keep from injuring trust in the first place. The integrity of the leadership of the organization [as well as] the truthfulness and transparency of the communication with[in] staff are both critical factors" (Heathfield, 2008).

In order to trust one another, it is first important to learn how to trust oneself. Although people hold roles or positions in their job, this is not the full role they play as human beings. It takes belief in oneself to begin to step outside this role and say "I really do not know what to do in this situation." It is about admitting when one is indecisive or confused, and listening to one's teammates for an explanation (Carr, 1992). It is important for people to trust themselves because it shows that they have self-confidence and assurance. When individuals know who they are, including their capabilities and limitations, they will be more comfortable sharing their ideas with their group mates. As Heathfield states, trust is the cornerstone and foundation for everything an organization wants to be and everything it wants to become in the future (2008).

Through teambuilding activities business employees and organization members will develop stronger relationships and learn to trust one another. Activities and adventures outside of the workplace that require problem solving skills and full participation can create a relaxing environment for people to better understand each another. Strong relationships can be built, creating comfort and connection that can be taken back to the workplace where meetings and conferences take place. People often hold project meetings knowing little about the other people in their project group. Interacting with one another outside of the workplace helps the formation of these relationships, and builds trust. There is a need by people of all ages for connection and for active engagement in the world around them. Interactive teambuilding activities and methods create an environment where group members get to know one another and have opportunities to participate actively in group work, in order to engage and build relationships and trust as a basis for what lies ahead of them in the workplace (Pollack, 2005). All of these characteristics will be important when developing a teambuilding

program for the Danish Open Air Museum because they will help corporate teams become stronger and more successful.

2.4 Techniques for Teambuilding with Interactive Media

Incorporating interactive technology into teambuilding activities can further improve the characteristics of a team, and thereby enhance the team members' experience. The implementation of technology into corporate teambuilding and similar programs is a recent trend (Bjornsen, 2005). For example, 'Geocaching' is a popular game where one participant hides a cache, a treasure, and provides the coordinates to another person who uses his or her handheld Global Positioning System (GPS) device to locate the cache. An outdoor adventure organization in the United States has tried this game, with a slight modification. Teams work together to find the caches, and each cache they find contains a clue to locating the next cache. In order to successfully complete the game, the teams must solve teambuilding challenges before they receive their next clue (Bjornsen, 2005). This shows how teambuilding exercises and GPS technologies can be combined together to create a GPS adventure that will develop a team's dynamics.

A similar example of a GPS adventure is the "GPS Urban Adventures" sponsored by Boston University. This is a teambuilding program that sends teams on a city-wide treasure hunt. Using GPS devices they are challenged to find certain landmarks, learn about the places they visit, and learn to work together to solve problems and make decisions. The program is customizable and adaptable for other locations, different age groups, and various group sizes (BU, 2007).

Frilandsmuseet in Lyngby, Denmark has an ideal atmosphere for a similar GPS adventure. With its large spread-out outdoor grounds and historical landmarks, it would be a natural location for a teambuilding program that utilizes GPS technology.

2.4.1 LifePilot Software

The GPS-equipped mobile phones used by Frilandsmuseet include location based information distribution software from a developer called LifePilot. LifePilot is a branch

of a larger company in Norway called Nordic Handscape which develops portable phone-based GPS software for relaying information. Nordic Handscape is trying to develop a mobile telephony platform specifically for cultural organizations and museums in the Nordic countries (*Nordic Handscape*).

Figure 4: A mobile phone and GPS receiver playing Mulighedernes Land.

LifePilot is currently used at the museum for the Mulighedernes Land program, which is shown in Figure 4. It was designed with the help of several outside parties, including a group of artists called TripleDesign, and has been a well-used addition to the museum programming (*Nationalmuseet*). This success and the desire to improve and expand have motivated a new initiative involving LifePilot at the museum.

The software for the mobile phones is provided by a company called Euman LifePilot. They have designed a system for delivering location-based information to portable devices such as mobile phones. Users navigate around a map by looking at the screen of their GPS-equipped mobile phone. When the GPS recognizes a specific location at the museum, known as a point of interest (POI), information is sent to the mobile phone, which quickly loads onto its screen. This information can consist of documents, pictures, sound, or a combination of the three. POIs may have variability in size, duration of existence, and visibility. In other words, a POI might only exist for a certain amount of time and then become invisible. Only when the user is in the correct

location at the right time will the information become available to the user. Another type of point is an Action Point (AP), which changes the virtual attributes of a group. For example, during a game such as the "Land of Possibilities", going to a certain AP might award one group with virtual money. The information about the money they received gets stored in the central server, becoming an attribute of the group or the group's virtual character. POIs and APs represent only a small part of the LifePilot software's capabilities.

The LifePilot software provides many additional features that may be used in a teambuilding program. One feature is the ability for a group to produce information at a location. For example, a group may take a picture with the mobile phone and upload it to the central server for other groups to access. When another group accesses that image, they will see exactly when and where it was taken. The software also has the ability to track where the other GPS-equipped mobile phones are in the museum. These features could be very useful in developing a teambuilding program which allows for communication among groups in case they need to work together to solve a common task.

Limitations of the software include its data transfer rate for uploading information and updating the positioning, its inability to function indoors, and inability to actually identify the other groups on the map although it can indicate where they are. However, it is worth considering that the people at Euman are constantly developing and expanding the capabilities of their software. It is possible to design a program that incorporates features waiting to be developed.

Consistent with its mission, Frilandsmuseet seeks to expand its use of the LifePilot technology by creating a teambuilding program that will attract businesses. Although the key aspects of a successful corporate team have been identified, it remains to be investigated what the Danes look for in a teambuilding program. In order to develop an enjoyable and effective game for businesses, we must first determine what Frilandsmuseet is looking for in such a game, and what the Danes would particularly enjoy. With an understanding of the features and limitations of the technology, we will be able to design and implement a GPS adventure program that will be enjoyable for Danish employees.

Chapter 3: Methodology

The main goal of our project was to develop an interactive program that would attract Danish businesses to Frilandsmuseet. To do this, we used tools available at the museum, namely, the LifePilot software, mobile phones, and GPS receivers, along with the museum layout and other activities already offered to businesses. We aimed to design an enjoyable, light-hearted game to challenge business workers in teambuilding activities as they worked together to achieve a common goal. In order to begin developing the program, we had to become familiar with Frilandsmuseet, its layout and the activities it offers. We then designed our program with input from various employees at the museum, tested our program to make sure it was feasible, and adjusted the program to accommodate any problems or misunderstandings, so that it would be ready for implementation into the LifePilot software for further testing.

Awareness of the cultural and historical significance of the museum was essential for us to create a program that was not only entertaining for visitors, but also informative and historically accurate. We used what we learned about the museum, from its employees, our sponsor, and simply from exploring the museum, to develop an idea for a teambuilding program that could be implemented with the use of the LifePilot software, mobile phones, and GPS receivers. Once our idea for the program received enthusiastic approval from the museum staff, we gathered props and tools necessary to construct a prototype of our program. We had volunteers test out our game to see if it needed improvements. A measure of the success of our program was determined by interviews with our sponsor and the museum employees. In the following sections we will describe how we acquired information about the museum and its current programs in order to develop a teambuilding program idea that would enhance the museum experience.

3.1 Learning about Frilandsmuseet

Before we could begin developing an idea for a teambuilding program, it was essential to learn about the museum and the specific programs it currently offers to its visitors of all ages. We were then able to examine possibilities for how the museum could

attract more adults and businesses. Through multiple interviews with project liaisons we were able to learn about the various opportunities for museum visitors. We interviewed Klaus Jensen, an Information Technology professional for the National Museum, and Rikke Ruhe, a museum curator, about the museum's programs, including the "Land of Possibilities" game mentioned earlier, as well as many holiday events and activities. The interviews were relatively informal, allowing conversation to be structured with interview questions, but also flexible to allow both Klaus and Rikke to control the focus of the interview.

From these interviews we learned more about the "Land of Possibilities" game, as well as specific holiday programs and activities at Frilandsmuseet. The "Land of Possibilities," is a role-playing game where children use a GPS-equipped mobile phone with positioning software to travel around the museum as a virtual character and learn about life in Denmark in the nineteenth century. Refer to Section 2.2.1 of the background chapter for more information on this game. Other activities that Rikke and Klaus mentioned included baking, performances, and old-fashioned games. They introduced us to Anja Jørgensen and Annemarie Vieth, two employees in charge of museum programs, who provided us with further information about activities that are currently offered to businesses who wish to spend a day at the museum. These activities included walking on stilts, tug-of-war, potato sack races, making yarn from wool, old wooden clog relay races, butter churning, milk barrel constructing, and folk dancing. From these informal interviews we determined the types of teambuilding adventure programs the museum workers might consider implementing in order to attract business workers to Frilandsmuseet.

The museum initially sought to develop a program that would be entertaining for adults and businesses in which employees work together to solve various tasks. We had thought our program would be almost exclusively based on teambuilding, but Anja stressed that the museum was most interested in a program that will get a company together to share an experience where they can get to know each other better, and have an enjoyable day. The program was to accommodate approximately twenty to forty people divided into six groups. Klaus added that he wanted us to design a program using the teambuilding theories and characteristics described in Section 2.3 of the Background

Chapter, but without formally addressing those characteristics in the game. In other words, instead of overcoming challenges that specifically target various aspects of teambuilding; the benefits of teambuilding would come through the process of playing the game and working with others within groups, as well as those in other groups. Therefore participants might not realize that they are experiencing a teambuilding program. In fact, the program will not be marketed strictly as a teambuilding program, because the museum cannot guarantee that people will work more effectively in teams after experiencing our program. However, in the process of solving different challenges, team members will be working together making decisions and communicating, while still having an enjoyable experience at the museum. The result of this activity can definitely be considered teambuilding, but it would not be in the museum's best interest to market it as such (Jensen, 2008).

After performing our initial interviews, we explored the museum and observed visitors as they traversed its grounds. We watched to see what people liked to do at the museum. Visitors enjoyed the outdoor atmosphere as they walked their dogs, some inquisitively entered all of the buildings and more closely experienced the history, and others actively played "The Land of Possibilities," running from location to location with GPS-equipped mobile phones, each representing a character of the nineteenth century. Observing visitors as they journeyed through the museum was important because it allowed us to record behavior as it occurred. We decided to try playing the role of visitors by leisurely traveling around the museum and entering the buildings while simultaneously studying what other visitors enjoyed and where they explored. Without pressuring visitors with questions, we were able to observe and see where visitors naturally went at the museum, taking notes of their journey and actions in order to determine what they particularly enjoyed.

Figure 5: Mobile phones and GPS receivers before running "Land of Possibilities".

Along with our interview and observation information, we also needed to become acquainted with the mobile phones that are used for the "Land of Possibilities" game. Klaus introduced us to the technology, and we were able to become acquainted with the mobile phones by test-running a game of "Land of Possibilities." Figure 5 shows the phones and GPS receivers we used to play a test game. Although the information was all in Danish, we were able to understand how the technology is currently used in the game, and what other features the technology can offer, which is described in section 2.4.1 of the background chapter.

3.2 Developing a Program Prototype

With information from our interviews, observations, and introductions to the technology we were able to start developing ideas for our teambuilding program. Developing the program involved determining an overall challenge for the game, developing a structure to the game with activities and obstacles, and then creating an appropriate story to integrate into the basic structure. We were not able to start the testing process until we had determined a specific game structure, but our goal was to create a program that could be tested with the LifePilot software. A GPS-based adventure can be a competition, a scavenger hunt, or role playing game as in the "Land of Possibilities." It was our responsibility to determine the structure that would be most appropriate.

Before we started brainstorming, we were able to review a summary of past surveys conducted by Frilandsmuseet which asked questions of adults who participated in "Land of Possibilities". The results of these surveys, which can be found in Appendix F, gave us some helpful ideas about what adults enjoyed and disliked about the game, or what they would have preferred. This was helpful for us because it was our responsibility to design a game oriented to the adult audience. Their suggestions included spending more time inside the historical buildings, interacting more with the other people playing the game, and paying less attention to the technology so they could enjoy the museum grounds. In an effort to respond to these suggestions, we sought to develop ideas for our program that would allow interaction among teammates, entrance into the historical buildings, and a combination of both a virtual game and a physical game.

Although we initially had thought that the teambuilding program would be mostly virtual, we eventually concluded that a teambuilding activity would be more enjoyable and interesting if it offered a balance between the physical and virtual elements of the game. We thought about designing a scavenger hunt where the players could collect either virtual or physical objects. Another idea was to develop a mystery program where players had to travel around the museum and collect clues to solve a mystery. In all of our ideas, however, we still needed to determine the role technology would have in our game. Since the museum has access to new and innovative technology, they wanted to use it as much as possible in their program in order to provide a unique experience, but at the same time the museum would like its visitors to enjoy the grounds and historical buildings and to learn about Danish history during their visit. We kept this in mind as we developed our ideas, and tried to design a program that balances these elements.

Important aspects we had to consider involved the notion of competition and the desired overall outcome of the teambuilding program. Although it was certain that the game must include a time limit to encourage the players to strategize plans and manage their time for accomplishing tasks the question arose as to whether we wanted to develop a competitive game, or a game where everyone must work together to solve a common task. Competition can help motivate people and challenge them to participate more, but it can sometimes lead to some bad situations, discouraging people and creating unnecessary conflict (Miller, 2007). Therefore, we had to consider how much we should incorporate

competition into the teambuilding program. An alternative was to develop a game where the team members did not compete against each other, but instead work together to overcome the challenges presented in the story and game. In other words, the team members would work together to find a treasure or prize. In this situation, they are all working toward a common goal or task in an allotted amount of time, where they must split the work among the group and constantly rely on their teammates to overcome challenges.

After we had thought through different options for the teambuilding program, it was necessary to analyze our ideas and develop a layout for the most appropriate game for the museum. For our project, we developed a list of the key elements of teambuilding that were necessary, and a list of elements that were desirable. As a result of this process we created a structure of a game that addressed all of the necessary teambuilding factors, while responding to our interviewees' thoughts and opinions, and incorporating the results from the "Land of Possibilities" surveys.

Before we moved on to the testing phase we presented our program idea to Klaus, Rikke, and Anja. Discussions were held to help us evaluate the outline of our program idea and to decide if the game represented an effective corporate teambuilding program that adults would enjoy. We had to combine our understanding of teambuilding with the wants and expectations of the museum administration. Our sponsor and the museum administration made sure our prototype satisfied the needs of the museum as well as those of the visitors. While the museum wanted a corporate teambuilding program that took advantage of its current technology to bring in more revenue to the museum, many adults, according to the surveys taken by the museum (see Appendix F), wanted to enjoy learning about the museum and using the technology, but also wanted to explore inside the museum's buildings and relate to Danish history in a more physical way. We therefore made sure our program fully utilized the technology while still making teammates interact with one another and explore the buildings. Rikke and Anja then helped us develop a historical plot that we could use for our game. They offered several suggestions, however they all believed that our idea was ready to be further refined and tested.

3.3 Testing the Program

In order to begin evaluating our program, we had to decide how we wanted to test it, considering we had only a brief period of time and could not fully develop an entire program. We simplified the game and wrote a script to include only two teams. Having only two teams would let us easily test the basic concepts of the game and allow us to observe the teams interact. After writing a script, we tested it without mobile phones to decide if the game was well laid out on the museum grounds, and also to determine the time required for the program. Our sponsor added the condition that team members be allowed to walk a maximum distance of three kilometers throughout the game, so we took that into account. We created an overall layout of the game on a map of the museum which illustrated where each POI is located (see Appendix D), along with a script that showed what information would be given through pictures, documents, and/or audio, at each point of interest (see Appendix A). To effectively test this setup, an instructor would need to follow the groups and read the script when the group reached a POI on the map. By creating the paper version of our game, we could effectively test our script and game layout without needing to enter it into the LifePilot software. This allowed us to travel the different possible routes of the game to make sure the distances and times were within the limits. Having our program on paper also allowed us to test the idea with student volunteers who offered us feedback on our game. We wanted our game to be challenging but not impossible, thus a time limit was introduced to pressure teammates to efficiently work together and come up with strategies to solve their task.

Once we tested our paper version of the game with volunteer students, we were able to make some final changes to the script and POI layout in order to perform a second test with the museum employees. This test was similar to our first test except for some final adjustments based on our first test. Klaus, Rikke, Anja, and Annemarie walked through the game, and evaluated the concept and the script. To determine if they believed the program would be enjoyable and an effective way to draw businesses to the museum, while the museum instructors evaluated the game, we evaluated their interaction throughout the game. We observed the participants as they were involved in the program, made sure they understood all of the instructions and rules, determined if the program

was being used correctly, and watched to see if participants had any difficulty. We also observed the participants and took note of their actions and performance in order to see whether or not they enjoyed the program.

Once we finished walking through the game with the museum employees, we were able to interview them and listen to their feedback. We decided to interview each participant individually so no one had an influence on the other employees' opinions. We learned what each participant liked and disliked about the program, and we took note of their recommendations for improving it. These comments allowed us to evaluate our program prototype, draw conclusions about the success of our product, and make any last minute recommendations before the detailed game layout and script is entered into the LifePilot server through a web browser. Due to limited time, we were unable to implement our game into the server; however this is one of the next steps in developing the program. Once the script is transformed into audio and images that can be downloaded onto the mobile phones, and the POIs are entered into the online server, the museum can run more tests to further analyze our program for practicality, understanding, and success.

Chapter 4: Results and Analysis

We were able to develop a teambuilding program prototype for Frilandsmuseet. Although much of our time was spent forming an idea for a program that could incorporate both the LifePilot equipment as well as the history at the museum, we had enough time to develop a game prototype for testing purposes. Due to lack of time, testing took place without equipment associated with the LifePilot program, such as the mobile phone and GPS receiver. Student volunteers tested the program first in order to help us adjust the game to the museum layout, and the distance and time limitations. After adjusting our game according to the suggestions and problems from the first test, we ran a second test without the LifePilot program for the museum employees to evaluate the quality and effectiveness of the updated game.

4.1 Program Concept

After considering and analyzing many different program options, we determined our best option would be an adventure game in which groups will use the fundamental elements of teambuilding to search for different physical and virtual objects around the museum that will help them prepare a nineteenth century style party or festival at the end of the game. Initially they will think that their task simply requires going to the correct location to collect their objects; however there will also be some unexpected challenges on the way where they will have to make choices, communicate with other groups, or cope with a change in events. As previously discussed, these elements are essential for teambuilding. Once groups finish collecting their objects, they have to meet back at a common location and help each other assemble their objects into the critical tools and parts necessary for preparing their party. The party would require coffee, bread with butter, decorations, and entertainment. Simple as it may sound, the groups working as a team would be responsible for each element. For instance, the visitors would grind coffee beans using an old fashioned coffee-grinder, and the bread would be eaten with homemade butter that they churned.

This was our best idea because it fulfilled all the requirements for a teambuilding game. The participants would be solving a common task, they would have to interact and communicate with each other throughout the game, they would be playing a game that is both virtual and physical, they would make use of the unique features of LifePilot, and they would have fun. There would also be varying levels of success for the party which would be determined by how well each group completed their task. Thus the visitors would take full advantage of the technology and activities offered at the museum while enjoying a teamwork-promoting adventure.

Before we could develop the premise of the game, we needed to determine whether we wanted the company visitors to compete against one another or work together to solve a common task. After discussing the subject with Klaus, he believed that teambuilding must involve some type of common task. He agreed that competition can get people into trouble and cause problems. The teambuilding activities he had participated in involved working together to build something, or achieve some common goal. After discussing this issue, we concluded that our game should require company members to solve a common task. This will prevent unnecessary conflict caused by competition; while at the same time promote team interaction, communication, cooperation, and decision making.

According to several Danish employees at the museum, competing against other employees in a teambuilding game is not as important as simply winning or losing as a whole. Various degrees of positive or negative outcomes in the game would be important, while doing better than coworkers in a competition would be less important. Based on this way of thinking, we decided to design a game where everyone would be working together on a common task. If one team fails the entire group would suffer, but the results would not be catastrophic. We wanted the teams to have to work together to achieve varying levels of success in our program.

Although they will be solving a common task, we still wanted the participating members to divide into groups with the mobile phones during the game in order to distribute the workload and develop small team dynamics. Each group would have one mobile phone and GPS receiver to navigate through the museum and visit points of interest. As they traveled from destination to destination, they would pick up clues, either

virtual or physical, that could be used for a final task at the end of the game. Participants must work together and build team dynamics in small groups as they travel around the museum. After they have collected all of their clues, they must meet the other groups at a common location, where they work together as a larger group to perform a final task. This allows them to develop small-scale team dynamics at the beginning of the game, but also see how they can work together towards a larger goal at the end of the game.

Once we developed the premise and structure of the game we needed to determine the role of the LifePilot software in our game. Initially we thought the museum wanted us to develop a program that extensively used the LifePilot software. Developing a teambuilding program that is mostly virtual would be hard to accomplish because teambuilding is primarily done with an instructor who can take charge of the program, ask questions to the group, and hold a debriefing session where participants can talk about their experiences with the game. The game would not have the same effect if it were completely virtual. After discussing the situation with museum personnel, we learned that the museum would assign an instructor to the game either way, because there had to be someone to teach the participants how to use the mobile phones and GPS receivers. This allowed us design a program where the final task is explained by an instructor.

It was then up to us to establish whether we wanted our clues at each location to be virtual or physical. The "Land of Possibilities" game is completely virtual apart from the fact that it takes place on the museum grounds, but we decided it might be better to design our program to have a more physical experience. The summary of the "Land of Possibilities" surveys suggested that the participants would rather spend less time with the mobile phones and more time observing the museum and its buildings. To accommodate for the desire to explore the museum buildings, we decided the mobile phones would primarily be used for navigation throughout the museum. At certain locations, information could guide groups inside buildings in search of physical objects that they are trying to find. This would allow the participants to use the LifePilot technology while still exploring the museum grounds and buildings.

While we focused on developing a program that allowed people to split up into groups, we also wanted them to communicate and meet up with other groups throughout

their journey. There are different ways that this can be accomplished. One idea was having a person or group designated as the command post, which would be in charge of relaying information to the other teams. This idea was not technically easy, and it was also unfair to the commanding group who would not get to participate in the game as much. Another idea was to allow the groups to take turns being the command post, but this became too complicated, and unrelated to our goal. We wanted everyone to be in charge of searching for other teams in order to exchange clues or objects, so that all of the groups are communicating with one another while they are playing the game.

To allow participants to interact with members of the other groups, we developed additional elements in our game. For instance, one of the groups might find a key that opens up a chest. This chest's contents and location could useful for a different group. Therefore, the group must use their phones to find the other team's location in order to give them the key. Because the teams are all working towards the same goal, they would want to help one another. This is important because the business participants are likely to encounter situations where they need to help out others. It is not always about individually being the best, but trying to make the company as a whole the best it can possibly be. This can only be done if everyone works together as a team.

Another way to help increase the interaction between groups is to use invisible points of interest throughout the game. Once a mobile phone crosses over an invisible POI, it will display information which could include other challenges that involve group interaction. For instance, the point might warn the group of some dangerous POIs that another group is near. It is then their job to go search for the other team and warn them not to go to the dangerous POI. We decided that we would use the feature of invisible points, but because this feature is not fully developed in the LifePilot program, we would not make it an important aspect of our game. At first, we wanted to have many invisible POIs throughout the whole game, but then we realized that this would be too overwhelming and difficult if they still wanted to accomplish their final task at the end of the game.

During the development of our program idea, we constantly wondered what type of story could be used to tie everything together. Although we had learned much about the museum, it was hard for us to pick an in-depth story for our game. Instead, we

thought of different themes that could easily be worked into our game. One idea was to have each group represent a different profession, such as, farmers, blacksmiths, bakers, and potters. We thought this would be our winning idea until we realized that we could not come up with a good reason for them to meet up at the end for their final challenge. Instead, we decided to turn that idea around. The groups would represent the people of a village and on their journey to collect items they would encounter virtual characters such as farmers, blacksmiths, bakers, and potters, who could help them find the participants' clues and objects. This approach is more interactive, because at the end of the game they can all work together to solve their final task, regardless of their virtual profession.

This final task was assumed to be a major teambuilding exercise where participants would have to work together to solve a problem. This problem could involve building something, or using objects that they collected to travel across an area of land. We thought of the idea of having the participants collect parts of a wagon wheel throughout the game, and then for the final challenge they would have to assemble the wagon wheel to the rest of the wagon, and somehow transport it across an area of land. Another option was to have the participants collect random objects around the museum, and at the end realize that they have a wagon with no wheels. Then they would have to use the objects they have collected to construct something like wheels to allow the wagon to move across a specified area.

Although these were our initial ideas, after talking with Anja and Annemarie we were told that this task could be too complex and difficult. Instead of having the participants construct something, we decided that they could prepare an event such as a wedding party or get-together. The participants would collect the decorations as well as some tools that can be used to churn butter, weave pot holders, and other things. This seemed like a great way to get people involved in the final task, while still giving them a choice of how to participate. Everyone would come from their separate groups and focus on one event: the party. At the same time, they can all work on different aspects of the party, but they are all working together and as a team.

4.2 The Game

Because we had a thorough plan for our games' final task, we were able to combine all of our other program ideas to develop a teambuilding game for companies. The following paragraphs describe the details of our program. Please refer to Appendix A for our in depth script.

The participants will first arrive and be introduced to the phones, GPS receivers, and LifePilot software. They will learn about all of the phones' features and button functions, how to connect to the GPS and the game, how to view information points and how to view where the other groups are at the museum. They will be told about the GPS receiver radius of accuracy, which is, at worst, fifteen meters. In other words, the central server will start loading the information when the phone is within fifteen meters of the POI. Knowledge of these features will help them when they are playing the game.

Participants will be told about conditions of the game such as the time limit and when they should report back to the Manor House. They will be given the mobile phone, GPS receiver, and physical map, which illustrates where all the points of interest are located. They will then be told the following:

- All of the groups have a common task.
- You have to work together or else you will not be able to solve your task.
- Some unforeseen events may happen, so it is necessary that you communicate with the other groups throughout the game.

Once these words have been said, the groups will be told to split up into groups on their own, and travel to their first POI destination.

Their first location is where they will learn about the background of the story. The mobile phone will tell them that they are the townspeople of village, and are preparing a party for some guests who are coming into town. Every group of the company is assigned a different task. They must complete these tasks by traveling to different POIs that are visible on their mobile phones. Whether groups complete their task or not, they must return to the Manor House by the specified time. The teams also learn that they each have a key to a chest that another team needs. It is each group's job

to deliver this key at some point during the game, to allow the other team to open their designated chest and receive an item.

At their next POI, they will receive some more information about what they need to collect for the party. Once they have gone to the first two points, they have a choice of where they want to go next. At each POI they will receive information about where to locate certain objects that will be needed for the party. They will collect those on their way, exchange the key they found with the correct key they need, and return to the Manor House to complete the game.

There will also be invisible POIs on the map. These points of interest, which are not visible on their mobile phone, will lead groups to a bonus location, where they will earn money which can be exchanged for items at the end of the game. The bonus location is the same for the all the groups, so it would benefit everyone to share the information of the location between groups. The currency located at the bonus location will also be available for all teams to take, based on the honor system, so, if they desired, they could take all the money at the location. Despite this, instructions will indicate that all the groups will get a bonus prize at the end of the game, in addition to what they can purchase with their money, if the money is evenly distributed between groups. This encourages teamwork and cooperation between the groups, but it also encourages individual thought in each group. A single team would be free to take all the money, but no one would get the extra bonus prize at the end of the game, so taking all the money could be advantageous or disadvantageous. In the end, teams will be forced to think about what is best for everyone and make a decision based on how much time they have left.

It is important to note that the bonus location is an extra location. It is not necessary for the party preparation, but it is something the teams can travel to if they have finished their journey early and have some spare time. Also, if one team fails to find an item due to lack of time, another team could potentially use their bonus money to buy the other team their necessary item that they did not receive during their GPS adventure. This extra element to the game also encourages communications between the groups participating in the game. The invisible points that tell each team about the bonus location will be scattered throughout the museum, but certain groups might not stumble upon an invisible POI depending on the path they take.

Whether they have reached their bonus location or not, once their time is up, the groups must return to the Manor House in order to meet with the museum instructor again, assemble their items, and learn how to set up for the party. Objects that were collected may include utensils, plates, napkins, woven pot-holders, pieces of a barrel for churning butter, decorations such as table cloths, center-pieces and curtains, candles, coffee beans, a coffee grinder, milk, and instructions on how to make butter and grind coffee. The museum instructor will show them where the party will be held, and the participants will be allowed a certain amount of time to decorate and set up for the party. If certain groups did not have enough time to collect all of their necessary objects during the game, then they must purchase items using money found at the bonus location, otherwise they will not be able to use that object for the party. After they have finished their tasks and time is up, they will be able sit down and enjoy their freshly-made coffee, bread, and home-made butter while relaxing with their fellow co-workers.

4.3 Initial Test

We tested our program on several different scales before it was turned over to the museum for further refining and implementation. Our first test was done using instructions written on paper instead of with the mobile phones. Nine students volunteered to participate in the test. Before they began their adventure, they were introduced to the game and were told about how the game would eventually be integrated into the LifePilot software. They were then told to split up into two separate groups, and each group was given museum maps that marked the locations they needed to visit. To facilitate testing the game without the mobile phones, we carried a copy of the script as we followed the two groups on their adventure around the museum. When they reached a POI on their maps, we stopped the group and read what the mobile phones would have displayed at each point. At that point in time, we were unable to place the objects inside the museum buildings, so for our test we had to carry the objects with us. When a character from the script offered the team an object, we told the team to briefly explore the building, and then we gave them the object. This simulated the act of teams actually searching for and finding items related to our game.

Throughout our test we observed each person's level of participation in the game, as well as their interactions with their group and with the other teams. After receiving their map, the participants worked together to plan out an efficient route to visit all of their points. Although it is possible for members of the group to venture from the person carrying the mobile phone, for this test both groups managed to stay together throughout their entire journey. This is probably because our initial test did not involve the use of keys and locked chests, so each group didn't need to split up to gather objects or information. In the real version of our game, however, it could possibly benefit the team if a group briefly separated to trade their key and visit the bonus point.

The groups unintentionally crossed paths twice during their journey. For our actual game each group has to exchange keys with another group in order to open a chest which holds a particular object. For this test, however, we did not have access to keys or locked chests, so the groups didn't necessarily have any reason to interact with the other groups. They did, however, meet up to exchange information on the bonus location, even though both teams already knew about its location. We concluded that although the museum buildings cover a large area of land, it is likely that different groups will see one another during their journey. If more than two groups are playing the game, they will be more likely to run into other groups. This could be helpful for when the groups have to exchange keys or information about the Bonus Location. The feature in the LifePilot software that enables one team to see another team on their screen would be very useful to get teams to interact while exploring the museum, whether to exchange keys or other useful information.

Another element that we observed during the test run was the amount of time it took for the groups to visit all of the POIs including the Bonus Point. For our actual game the groups will have a limited amount of time to visit all of their POIs, but for our test we did not set a time limit for the participants because we wanted to determine how much time it would take for each team to complete the first phase of the game: gathering the objects and returning to the Manor House. For this test, the coffee preparation group finished their journey in an hour, while the butter churning group finished their journey in approximately an hour and a half. We realized that the latter group had POIs spread out over the entire grounds of the museum, and thus had to walk more throughout the

museum The coffee preparation group, on the other hand, didn't have to do as much walking back and forth, and finished a half an hour earlier. We concluded that before we tested the program for a second time, the positioning of the POIs needed to be adjusted to accommodate for this time discrepancy.

Although there was a difference in traveling time between the two groups, overall the participants thought our game was interesting and engaging. They enjoyed the style of our script and thought it was appropriate for the atmosphere of the museum. They also liked the idea of having open-ended POIs so that each group could choose their own route throughout the game, and the concept behind the bonus point. They did suggest, however, that the script should be slightly adjusted so that each POI is independent, and each character they encounter does not reference another character. In other words, a character at one POI should not suggest visiting another particular character located at a different POI. Groups found this confusing because they were not sure if they had to visit certain characters twice to gain more information. In order to clarify this misunderstanding, they suggested that the script be more ambiguous, revealing relevant information at each POI, but not referencing other POIs. This would allow the participants to choose their own route without being misguided by the information at certain POIs.

After completing the first test and receiving some feedback, we adjusted our script and POI layout so that each team would spend approximately the same amount of time walking around the museum. To do this we decided to shorten the butter churning group's route to make their journey take approximately an hour to complete. We changed the order of their three starting POIs and positioned them among their other POIs, so that the participants would not be travelling back and forth between certain areas of the museum.

4.4 Final Test with Museum Employees

After testing our program with our fellow students, we were ready to have a trial run with employees from the museum, in order for them to become familiar with our concept and experience our project first hand. Klaus Jensen, Rikke Ruhe, Annemarie

Vieth, and Anja Jørgensen participated in this test, which was similar to our test with the fellow WPI students, but this time we provided an in depth explanation of the miniature games and tried to use the LifePilot mobile phones and GPS receivers to locate the other team during the game. We also tried to incorporate the key and locked chest concept into this test, but because we did not have access to lock boxes, we had to tell the employees about this concept and let them know that they would only receive a particular object if they located the other team and traded keys. In addition, the employees in this test were already familiar with the museum grounds, which was helpful in our test because they were only available to play our game for an hour. Regardless, they understood the idea of our program without going through its entirety, and their feedback was very useful and encouraging for our project. This test was helpful for both ourselves to receive any final feedback, for them to become acquainted with the work we have done over the past seven weeks.

We began by giving an introduction to our game that was rather short because the participants were already familiar with LifePilot and the museum. We told them to break up into two groups: Klaus and Anja decided to play for the coffee making group, while Rikke and Annemarie played for the butter churning group. As in our previous test, we followed both groups, read the scripts, and acted as the GPS, while observing the participants reactions to the main elements of the program.

After they finished the brief run-through of our prototype, we interviewed each participant individually to learn about their thoughts and suggestions about the program. The interview questions can be found in Appendix H, but because we did not have enough time for them to complete our entire program, some of the questions were changed during the interview to be more relevant to their experiences. In general, their comments were overwhelmingly positive, and they were very excited about our program. They seemed genuinely involved in our test game, taking shortcuts and having us quickly read the text in order to win as fast as possible.

Everyone seemed to agree that some parts of our script needed to be more obvious, such as instructions for the miniature games and the bonus location, along with other more specific elements, such as when players are supposed to search in buildings for particular objects. The museum employees noted that participants might become easily

distracted while playing the game and miss subtle clues that the virtual characters are saying to the players. They also mentioned that there needs to be a balance between being completely clear and obvious in the game instructions and being too subtle and ambiguous.

Employees of the museum agreed that many important teambuilding elements were incorporated in the design of our program. Although we could not include all of the features we wanted, our final design included most of the necessary features and some additional enhancing features. Elements of our game, such as the miniature games, could also be removed at the museum's discretion, but the interviewed employees seemed to enjoy this aspect of our program. They believe that the game could easily be marketed because Danish companies are interested in having unique teambuilding experiences outside of the workplace. The museum can offer both a large picturesque and historical setting as well as new innovative technology, which is perfect for a teambuilding experience. Given the success of similar programs in the United States and the promising results of our small-scale tests, our game should help bring more people to Frilandsmuseet, and allow a company to enjoy both a relaxing and entertaining day where they possibly learn something new about their co-workers, and further develop some of their teambuilding skills.

Chapter 5: Conclusions

This project resulted in the creation of a prototype teambuilding-themed adventure program at Frilandsmuseet that uses the LifePilot software for GPS-equipped mobile phones. The targeted audience for the program is adults who work in a business environment or work with others in some other setting. This project completely satisfied the requirements of our sponsor, Klaus Jensen and the Danish National Museum. The project took six weeks to complete, in addition to seven weeks of preparation by researching off-site. Although we completed the requirements of our sponsor from start to finish, many of the preliminaries for our project had already been established.

Several preexisting programs and opportunities at the museum made this project possible. The presence of the recently-installed "Land of Possibilities" program laid the groundwork for much of our new program. "Land of Possibilities" provided a medium upon which to test the LifePilot location-based information software. As a result, it has seen several improvements in the last two years that have increased its effectiveness and ease-of-use and thereby greatly enabled our project. Much of the project that created "Land of Possibilities" was a study to determine the effectiveness of the new technology it utilizes. With that study already completed by the start of our project, we had confidence in the ability of the LifePilot mobile platform. By creating the framework for an innovative teambuilding program for adults at Frilandsmuseet, we set the stage for similar programs at a wide range of locations to be developed. Our program takes advantage of nearly all of the features of the LifePilot system but also pushes for new development that would enhance ours or other future adventure programs that use the LifePilot technology. These proposed developments are outlined in Chapter 6, Recommendations.

Another opportunity at the museum that greatly helped our project was the existence of programs and activities for adults. Although none of them are nearly as complex or teambuilding-based as our program, they gave us an indication as to the theme and style of the programming at the museum. In fact, it is possible for many of the preexisting activities to be incorporated into the program that we developed. The existence of these programs also enabled us to make accurate cost estimates for

establishing and running our program. By knowing how much various parts of "Land of Possibilities" and other programs cost, we could confidently create a budget that ensures that our program will be financially responsible.

5.1 Special Features

The program we developed has several special features which make it more marketable and enjoyable for its users. For example, it is customizable to accommodate a wide range of group sizes. Originally designed for twenty to forty participants, we have suggested in Chapter 6 a modification to the program that would allow for being able to accommodate groups as small as twelve. Additionally, we have made the program so that certain elements of the game can be removed if there are too few participants, and more elements can be added on for larger groups. Such elements include the number of characters in the game as well as the time required to prepare the event at the end. The interaction between the characters in the game comes externally to the plot of the game which allows for the easy removal or addition of characters.

In addition to creating the teambuilding program, we also compiled materials for a program guidebook to be used by the instructors (composed of materials in Appendices A through E). This guidebook includes maps, basic instructions, and some of the finer behind-the-scenes details of the program. This will not only assist in training new program instructors but it will create deeper understanding of the program for people who might want to improve or expand upon it in the future.

The game itself takes advantage of a special feature within LifePilot that helps to make the game more exciting. This feature is the ability for groups to see the locations of the other groups on the screen of their mobile phone. It allows groups to more easily interact, a key element of teambuilding. Even though our program was created from the success and inspiration of the "Land of Possibilities", it still contains many new features and elements that make it innovative and appealing to new audiences.

5.2 Finances

We have created a program that is both enjoyable for the participants and fiscally friendly for the museum. Our program is designed for twenty to forty participants who work in the same setting. Appendix G shows the costs of running the program once as well as a breakdown of the project's startup costs. In summary, the greatest expense is the labor cost for the museum to finish developing the program. Revenue would come entirely from the companies participating in the program. From examining the costs of similar teambuilding programs, we recommend an asking price of at least 10,000 DKK per iteration of our program. This will theoretically generate approximately 7500 DKK of revenue for the museum each time the program is run. This money will be used by the museum to develop new programs as well as to counteract a recent freeze on funding increase from the Danish Minister of Culture. The prospect of bringing in such revenue to the museum in addition to new visitors and programming has Frilandsmuseet eager about its implementation.

Given the estimated total startup cost to the museum of approximately 120,000 DKK, it will take approximately 16 iterations of the program for it to pay for itself. This is relatively few and therefore highlights the money-making potential of our program for the museum.

5.3 Project Success

From analyzing the results of our tests of the program that we developed, we can safely assume that the program will have at least some if not astounding success for the museum. Although our initial mockup helped us to identify many strong points of the program, it also revealed some flaws with the script. These flaws were fixed and a more sophisticated mockup was conducted with museum administrators and LifePilot-equipped mobile phones. This test confirmed the success of our project in that our customers, the museum administrators, were very satisfied.

Another measure of our program's potential for success is its adaptability to different environments. Frilandsmuseet is a unique place and represents an essential

implementation opportunity for LifePilot. Our program has high potential for success from the perspective of the Euman LifePilot company because it can be easily implemented in environments other than open air museums. The game only requires a large area with buildings for hiding objects and a kitchen with dining area for the feast or celebration at the end. The objects, story, and premise of the game can easily be altered for other settings, such as more modern environments like a city block. The possibilities for expansion and customization of the program are numerous. In addition to customizing the program the museum already has an entire arsenal of activities that can be appended to the program. Being able to cater the program to a customer's specific desires greatly contributes to the marketing potential for the program. The implementation of our teambuilding adventure game at Frilandsmuseet could inspire other museums and organizations to develop similar programs across Denmark, and even around the world.

Chapter 6: Recommendations

Because of technical limitations imposed upon us by the capabilities of the LifePilot software, along with the potential to develop new features, there are many recommendations we have for improvement of our teambuilding program. In addition, we lack the time and the resources to complete a full scale implementation in our project, so many improvements could be made by further testing and evaluating a complete program. We believe further development of our program would yield a very marketable product for the museum, be very cost effective, and would not be taxing on the museum's resources.

6.1 New LifePilot Features

Because a complete program would take many more months to develop, there is a possibility to improve the program through new features that can be added to the LifePilot software. The current features of the LifePilot software are somewhat limited because it was initially designed to provide location based information to a single user. Although there are not many ways two groups can interact virtually in our prototype, new features and improvements in the LifePilot software could easily be implemented and used in our program.

A feature that made two phones running the LifePilot software able to interact with one another's points of interest would be relatively simple to implement, and would vastly improve the teambuilding aspects of our program. This feature would allow two teams to work together and visit each other's information points, or, alternatively, new features could be added to the plot of the story. For example, one group could be infected by a virtual 'virus', which would infect points of interest in the area, so another team would have to visit these points to gain their information. The ability to interact with another team's points of interest could also lead to situations where one team is surrounded by a virtual minefield, and another team is able to disable the mines. The addition of this feature would clearly enable more interaction between teams, which, of course, would be a great benefit to our teambuilding program.

Another feature that would be relatively easy to implement is the ability to gain virtual, instead of physical objects. In our program, teams are challenged to collect physical objects throughout the museum in order to prepare for a final event. Unfortunately, this setup requires an instructor to place objects throughout the museum before the program begins. If this task is too difficult, or alternatively, if any of the objects are too large or delicate, an icon could appear on their screen to indicate that they received this object. At the end of the game, an instructor could simply give them the object. There is a similar setup in "Land of Possibilities," where each group gains points for their character in order to complete the game. In our program, a balance between virtual and physical objects would be ideal, since we want to include useful technology that would help the museum and add an interesting element to the gameplay.

Other features of the LifePilot software could be enhanced in order to enhance the game experience. The feedback we received from the adults who played "Land of Possibilities" indicated that sometimes the maps were slow to update. Others complained about discrepancies between the virtual map displayed on their phone and the physical map they were given in order to navigate the museum. Problems like this could easily be fixed in order to make the game run smoother and be more immersive.

In our program, we would also like to use a new feature that is not currently implemented in the "Land of Possibilities," which shows the location of other phones on the map. This would help teams locate one another and be able to interact, however the positioning software still needs some improvements before this feature is fully usable. We were unable to successfully locate the other team in our user test with the museum employees because the software was slow to update and we could only see a small portion of the map on our phones without scrolling around the screen. Improvements in this feature would be extremely beneficial to our program because the feature has a lot of potential to get teams to interact throughout the game.

6.2 Improvements to the Program

In regards to improving the entire program, the museum would first need to accept our idea and bring it to completion. This would involve having museum curators and historians improve our script so it provides as much historical and cultural

information as possible while still being entertaining. Our program did not intend to directly state historical or cultural facts to visitors; instead they would learn about society and living in the nineteenth century through experiencing the game and making observations. Also, tests have already been done on the "Land of Possibilities" program to determine what type of plot is most interesting to various age groups, so this data could easily be used to improve our program.

Further development would also require scripts for more groups of players in our program. Our test program includes only two activities to prepare for the party, butter churning and coffee making. Other groups would also need to collect interesting objects in order to prepare for the party, so scripts would need to be written for any additional activities, such as cloth weaving, decorating, providing entertainment, making beer, or baking bread.

The addition of more objects and activities to prepare for the party would also make our game scalable and customizable for the businesses. For example, if a small company wanted to participate in the program and it only had enough people for two or three groups, they could choose the activities they wanted to do to prepare for their party, such as butter churning and making coffee. Alternatively, larger groups could easily be accommodated simply by adding activities to their final event, such as providing entertainment or doing decorations for the party. Our current program does not account for this type of scalability, because they keys and locked chests in our program are dependent on the amount of groups in the game. Despite this, redesigning this aspect of the game would not be difficult; the instructor for this game would simply need to place keys in their correct location so each team would have the key of another team that is playing. Regardless of the complications, taking the scalability into account when completing the design of our game would be relatively easy to implement, both into the story and into the LifePilot software, and it would greatly increase the marketability of this program. Virtual objects, which are explained in the next section, could be added to reduce the burden of preparing the program for large groups.

Making our program customizable by adding more activities would also allow the museum to adjust the program for different seasons. For example, in the summer the program could be held outside, with a harvest themed celebration, while in the winter, a

business could prepare its own Christmas party. The ability for businesses to customize the individual activities in the program, along with the theme of their celebration, would increase the marketability of our program. A business could come back another time of the year and have a completely different experience.

With the design of a new teambuilding adventure game at Frilandsmuseet there are bound to be many other additions and alterations to the program other than the ones we have suggested. Nevertheless, we used the fundamental concepts of teambuilding, along with the LifePilot technology available at the museum, to construct a prototype of a teambuilding adventure game which will possibly inspire the creation of other technologically involved teambuilding games in Denmark and worldwide. The completion of the program we have outlined will certainly be a valuable asset to the museum, providing revenue and attracting visitors, while offering a completely unique atmosphere and program that cannot be found anywhere else. This program demonstrates that modern technology can enhance a teambuilding game by adding a virtual layer on top of the participants' physical surroundings to create an environment that harbors group communication, interaction, decision making, and trust.

References

Anderson, G. (2004). *Reinventing the Museum: Historical and Contemporary Perspectives on the Paradigm Shift.* AltaMira Press.

Anderson, M. L. (1999). Museums of the Future: The Impact of Technology on Museum Practices. *Dædalus, 128.*

Anderson, M. L. and Taylor, H. F. (2006). *Sociology: Understanding a Diverse Society* (4th ed.). Belmont, CA: The Wadsworth Corporation.

Archambeau, K. (2006). *Climbing the Corporate Ladder in High Heels.* In (D. Walsh, Ed.). Franklin Lakes, NJ: The Career Press, Inc.

Bjornsen, Kristin (2005, Feb 11). GPS-based 'Geocaching' is Latest Corporate Team-building Technique. Wichita Business Journal.

Bly, S. A., Harrison, S. R. and Irwin, S. (1993). Media Spaces: Bringing People Together in Video, Audio, and Computing Environment. *Communications of the ACM, 36*(1), 28-46.

Boston University. *Sargent Center for Outdoor Education*. Team Building Adventures. Retrieved February 10, 2008, from http://www.bu.edu/outdoor/conferences/teambuilding/index.html

Carr, C. (1992). Teampower: Lessons from America's Top Companies on Putting Teampower to Work. Englewood Cliffs, NJ: Prentice Hall, Inc.

Cohen, L., Manion, L. and Morrison, K. (2000). *Research Methods in Education* (5th ed.). London, England: RoutledgeFalmer.

Euman LifePilot. LifePilot. Retrieved February 2008, from http://www.lifepilot.dk/company/uk/index.jsp

Falk, J. H. and Dierking, L. D. (2002). *The Museum Experience.* In (M. Candage, Ed.). Washington, D.C. Whalesback Books.

French, W., and Bell, C. (1984). Organizational Development: Behavioral Science Interventions for Organization Improvement (3rd ed.) Englewood Cliffs, NJ: Prentice Hall.

General Electric. Our Company. Retrieved February 2008, from http://www.ge.com/company/index.html

Grinter, R. E., Aoki, P. M., Szymanski, M. H., Thornton, J. D., Woodruff, A. and Hurst, A. (2002). Revisiting the Visit: Understanding How Technology Can Shape the Museum Visit. *Computer Supported Cooperative Work*, 146-155.

Handler, R. (February 1993). An Anthropological Definition of the Museum and Its Purpose. Museum Anthropology, 17(1), 33-36.

Handwerker, W. Penn (2001). *Quick Ethnography.*Lanham, MD: Rowman and Littlefield Publishers, Inc.

Hayes, N. (1997). *Successful Team Management*. London: International Thomson Business Press.

Heathfield, S. M. (2008). Trust Rules: The Most Important Secret About Trust. Retrieved February 9, 2008, from http://humanresources.about.com/od/workrelationships/a/trust_rules.htm

Hood, M. G. Staying Away: Why People Choose Not to Visit Museums. Museum News, April 1983.

International Council of Museums. Development of the Museum Definition According to ICOM Statutes (1946-2001) Retrieved February 2008, from http://icom.museum/hist_def_eng.html

Jensen, Klaus. Personal interview, March-April 2008.

Jørgensen, Anja. Personal interview, April 2008.

Katzenbach, J. R. and Smith, D. K. (1993). *The Wisdom of Teams: Creating the High-Performance Organization.* United States of America: McKinsey and Company, Inc.

King, T. R. (1996). Teams and Techniques for World Class Improvement. Franklin, Pennsylvania: Thomas R. King.

Knight, P. T. (2002). *Small-Scale Research.* Thousand Oaks, California: Sage Publications, Inc.

Krieger, S. (March 27, 2006). 'Geocaching' Takes Hold for Meetings. *Meeting News*, *30*(4), 14-14. Retrieved February 3, 2008, from Business Source Premier database.http://wf2dnvr8.webfeat.org:80/xJeLJ181/url=http://search.ebscohost.com/login.aspx?direct=trueanddb=buhandAN=20432476andsite=ehost-live

Levi, D. (2007). Group Dynamics for Teams (2nd ed.). Thousand Oaks, California: Sage Publications, Inc.

LifePilot. Mulighedernes Land. Retrieved February 2008, from http://www.lifepilot.dk/company/dk/files/Brochure_MulighedernesLand.pdf

Magelssen, S. (2007). *Living History Museums: Undoing History Through Performance.* UnitedStates: Scarecrow Press.

Malaro, Marie C. (1994) Museum Governance: Mission, Ethics, Policy. Wasington and London,Smithsonian Institution Press.

Marris, P. and Thornham, S. (2002). *Media Studies: A Reader* (2nd ed.). NY, NY: New York University Press.

Midura, D. W. and Glover, D. R. (2005). *Essentials of Teambuilding Principles and Practices.* Daniel W. Midura and Donald R. Glover.

Miller, Brian Cole. (2004). *Quick Teambuilding Activities for Busy Managers*. Broadway NY, NY: American Management Association.

Miller, Brian Cole (2007). *More Quick Teambuilding Activities for Busy Managers: 50 New Exercises That Get Results in Just 15 Minutes*. Broadway NY, NY: American Management Association.

Morgan, D. L. (1997). *Focus Groups as Qualitative Research* (2nd ed.). Thousand Oaks, California: Sage Publications, Inc.

Nationalmuseet. Open Air Museum. Retrieved February 2008, from http://www.nationalmuseet.dk/sw20384.asp.

Newstrom, J. and Scannell, E. (1998). Big Book of Team Building Games. United States of America: McGraw-Hill Companies, Inc.

Nordic Handscape. Nordic Handscape: Cultural Heritage in a New Form. Retrieved February 2008, from http://www.nordichandscape.net/reports/nordic_handscape_english.pdf

Old Sturbridge Village. Our Museum. Retrieved February 2008, from http://www.osv.org/museum/index.html

Paris, S. (2002). *Perspectives on Object-Centered Learning in Museums.* United States: Lawrence Erlbaum Associates.

Perlow, Emily. Personal interview, February 2008.

Pollack, S. and Fusoni, M. (2005). Moving Beyond Icebreakers. Boston, MA: The Center for Teen Empowerment, Inc.

Powell, R. R. (1997). *Basic Research Methods for Librarians* (3rd ed.). Westport, CT: Ablex Publishing Corporation.

Romiszowski, A. J. (1992). Developing Interactive Multimedia Courseware and Networks. In Promaco Conventions (Ed.), Proceedings of the International Interactive Multimedia Symposium, 17-46. Perth, Western Australia, 27-31 January. Promaco Conventions.

Ruhe, Rikke. Personal Interview, March-April 2008.

Scholtes, P. R., et al. (1988). The Team Handbook. Madison, WI: Joiner Associates Inc.

Singleton, S. (2006). Coping with Change: Develop Your Personal Strategy. Retrieved February 9, 2008, from http://ezinearticles.com/?Coping-with-Change:-Develop-Your-Personal-Strategyandid=51313

Smolowe, A., et al. (1999). Adventure in Business: An I.M.M.E.R.S.I.O.N Approach to Training and Consulting. United States of America: Project Adventure, Inc.

Tyler, T. R. and Blader, S. L. (2000). Cooperation in Groups: Procedural Justice, Social Identity, and Behavioral Engagement. Psychology Press.

Vieth, Annemarie. Personal Interview, April 2008.

Weil, S. E. (1990). Rethinking the Museum and other Meditations. Washington D.C. Smithsonian Institution Press.

Welch, J. (2005). *Winning.* New York, NY: HarperCollins Publishers, Inc.

West, M. A. (2004). Effective Teamwork: Practical Lessons from Organizational Research (2nd ed.). Oxford, UK: BPS Blackwell.

Wittlin, Alma S. (1970) Museums: In Search of a Usable Future. Cambridge, Massachusetts, and London, England. The MIT Press

Woodard and Curran. Our Company, Our Story. Retrieved February 2008, from http://www.woodardcurran.com/about/default.aspx?linkidentifier=idanditemid=52

Appendix A: Teambuilding Game Script

Introduction to the Technology and the Game:

- Introduction to the technology
- Information on button functions
- Introduction to Points of Interest (POIs): audio, documents, and pictures
- Feature to view where other groups are in the museum
- Accuracy of each point is, at worst, 15 meters
- How to take pictures using the phone

Instructor: *(*After instructor has completed his/her introduction to the technology*) You are now ready to begin your GPS adventure game.*
For this game, you will all be working together towards one common task. You will not be able to solve this task unless you work with everyone around you.
(Addressing all of the groups.)
Each group must start at their designated starting location which is shown on the map that I have passed out. At this location you will get more information. You have exactly an hour and a half to complete your task. At _____ o'clock you must be back at the Manor House. This location can be seen on your map. Please listen carefully and pay close attention to your mobile phones as well as the surrounding area because some unforeseen things may happen along your journey. I wish you all the best of luck, and I will see you at ____ at the Manor House. You have _____(number) phones to use.
(Passes out a phone and a map to every group.)
Please decide how to split up into groups now. You may begin.

Team A: The Butter Churning Group

Potter - Introduction Point (32): *Hello there folks! Are you on your way to the party? What? You haven't heard? How is that possible? _____ , _____, and some other guests are coming into town this afternoon for a _____ party. Preparations for the welcoming party are underway, but there is still much that needs to be done. I was just on my way to Farmer Tom's to see if he has any butter for the rye bread, but I am also needed at the brewery to make sure there is enough beer. Do you think you can find Tom's place and get some butter for me? It should be a quick errand and besides, you have 1.5 hours! Oh, and by the way, look inside the nearby farm for a key. Unfortunately, this key is red, and you will need the BLUE key in order to open a very important chest which you will find on your journey.. One of your other groups of friends has the key YOU need, so you'll have to find them in order to exchange keys. Thanks so much for helping everyone out! Just make sure that you arrive at the Manor House to prepare the party at _____o'clock. Don't be late!*

Farmer Tom (34): *I'm afraid I am all out of butter, but you have plenty of time to make some before the party. Maybe you could look for a butter churn and find some milk somewhere; it would be nice to have fresh butter for the party. Look around for Morten; I think he can help you churn some butter. Good luck!*

Morten – Smallholder (8): *So I heard you need to get some butter for the party. We're all out of butter here, and our last churn broke and we haven't had a chance to pick up the replacement parts yet. Unfortunately, I am too busy to go get them right now, but you should go find the churn parts and put it together yourself. It's not too complicated. You're going to need these wooden pieces, some metal rings, and a top and bottom to the churn. (Picture of churn shown) I need to get back to work now. Enjoy your party!*

Birgitte – Fisherman's Wife (64): *We don't have any butter for the party?! And you don't even know how to churn butter?! This could be a disaster; we're almost out of time! Let me quickly explain to you how to churn butter. (*Insert Instructions Here*)*

Torsten - Clog Maker (68): *I hear you ran out of butter for the party! My wife usually just buys the butter at the general store, but I think they may be all out. That's not good news, we don't have much time before the party. I don't know anything about churning butter because I spend most of my time making clogs, but I did help the carpenter make some wooden slots for a butter churn last week. I think I left them inside my establishment. Why don't you take a look?*

Jorn - Blacksmith (70): *Well that is too bad that you need to make your own butter for the party. Didn't Farmer Tom have some butter for you? I don't know much about butter making, but I do have some metal rings you can use for a butter churn laying around my shop. Go have a look for yourself.*

Jorck - Carpenter (81): *Sorry, but I am extremely busy and I won't be able to help you assemble the butter churn. I do have the tops and bottoms, but they are locked inside a chest in my workshop. The thing has been locked for ages though, and I can't seem to find the key to open it. Maybe some of your friends have it. As for the rest of the churn, try asking Torsten, the Clog maker. He helped me make some of the parts last week.*

Niels (9): *How should I know how to churn butter? I am a fisherman. My wife does the farming. I can't really help you at all. However, if you're looking for a place to stay for a couple nights, I have an extra bedroom and kitchen. Ah I know! I bet you'll need some milk for making the butter. If you can help my wife milk the cows out in the field, just outside my place, then you can have some milk. I'll mark them off on the map for you. Oh, and maybe you'll come across our spare milk bucket after you've seen all the cows. My wife misplaced it, and we can't seem to find it anywhere!*

Niels' Wife (near 9): *My husband tells me that you're here to help in exchange for some milk. We can put the milk in my bucket for now, but that spare one is somewhere around here. Well, maybe you'll have an idea of where to look after milking the cows.*

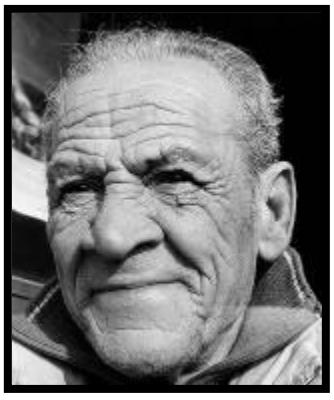
Invisible Point*: NO-NAME MAN: Hold on a second! Sorry to bug you, but I think you might want to take a stroll down towards the south end of the village if you have some extra time. It could be helpful for the party, so you might want to tell all of your friends. It's not crucial, but it might be worth taking a visit, time permitting. Good luck, and I will see you at the party!*

Invisible Bonus Point*: Congratulations! You have found the bonus location, so you receive 100KR. Please go inside and take your prize. The more teams to visit this location and take a prize, the more extra money there will be to purchase items at the festival.*

Team B: Coffee Preparation Group

Introduction Point (43): *Hello there folks! Are you on your way to the party? What? You haven't heard? How is that possible? _____, _____, and some other guests are coming into town this afternoon for a _____party. Preparations for the welcoming party are underway, but there is still much that needs to be done. I was just on my way to get some coffee at the Coffee Lady's place, but I have so much more to do for the preparations. Would you mind finding the Coffee Lady and getting some coffee for me? It should be a quick errand and besides, you have 1.5 hours! Oh, and by the way, I advise that you look inside the nearby farm and collect the key. Unfortunately, this key is blue, and you will need the RED key in order to open a very important chest which you will find on your journey.. One of your other groups of friends has the key YOU need, so you'll have to find them in order to exchange keys. Thanks so much for helping me out! Just make sure that you arrive at the Manor House to prepare the party at _____ o'clock. Don't be late!*

Carin - Coffee Lady (42): *I am terribly sorry, but I cannot offer you any coffee today. I was just about to make my batches for the week when dirty old Ralph, Farmer Tom's dog, came running into my house, and knocked all of my freshly ground coffee all over the floor. Then the dog started sneezing, coughing, and having a fit, which made even more of a mess! You'll have to ask my husband, Hagen. He's back at our house down the road Maybe he can help you.*



Hagen – Coffee Guy (54): *I hear you are preparing some coffee for the party. We're all out of ground coffee at the moment, but I'm sure it would be easy to find some coffee beans around town, and grind the coffee yourself. We're going to need more than just coffee for the party, though. It would be really nice if you could pick up a clean kettle as well, you know, to boil the water for the coffee. Jorn, the Blacksmith (54) or the Mia, the Seamstress (60) might know where you can look for one!*

Jorn - Blacksmith (40): *How should I know where a kettle is? I don't care about your party, I have much more important things to do. Go away, you woke me up from my afternoon nap!*

Mia - Seamstress (60): *Sorry, but I'm fresh out of coffee and my kettle is old and leaky. I just drink so much of it in order to get my sewing done. I do have a coffee grinder though that you can use, I think it's the nicest one in town. Have a look around my shop for it. Good luck!*

Dorete (34): *Sorry Chaps, I need my kettle to make myself some coffee before the party. It helps to get me going before a big occasion. But, let me tell you some helpful hints about how to make some delicious coffee. Well, first, you just need to grind up all the coffee beans. Then heat yourselves up some water. Don't burn yourself! After the water is nice and steamy, add a filter, and then pour the water over the coffee, it's as simple as that. Ya know, coffee is just the greatest thing! Back when I was a young girl, which, of course, wasn't too long ago, I made the mistake of putting my mother's hot coffee pot on the kitchen table. After I finished washing some dishes I turn around to find a large hole in the middle of our table! The pot had started a fire and burnt a hole in the table! Fancy that! Luckily we were able to put out the fire before the whole house burnt down. But, boy, was that a crazy afternoon. I remember having to bathe Theodore, that was the name of our cat, the longest bath of her life, because she smelled like smoke! And let me tell you, that cat hated baths! She hated a lot of things, that darn cat. But, anyways, I'm sure you have more important things to do right now, unless you would like to hear more stories about my lovely Theodore. Oh, what a lovely cat he was. Oh, how I miss that darn thing. Anyways, enjoy your journey, and make sure you remember those instructions for making coffee. It's very important that you get it right for the party. You don't' want to burn a hole in the table, now do you? Good luck, chaps! I will see you at the party! Toodle Pip!*

Maren (6): *Well, I couldn't tell you anything about where to find a kettle, but I do have a cup and saucer that you can use. It is somewhere in the _____ building. You can't miss it! Good Luck!*

Mr. Jensen (63): *I'm glad I found you, I was supposed to get a kettle for the party, but someone locked it in the black chest that is in the bedroom. The party is coming up, and I have no idea who has the key! Maybe you could ask your friends if they have the correct key.*

Asger – Farmer (4): *Hey, I have some roasted coffee beans that you can use for the festival, but could you lend me a hand first? I had this huge basket of vegetables all ready for the dinner, but I left it outside for a minute and it seems like someone or something scattered them all over the place. I'll mark them off on your map if you'll help collect them again for me, and in return I'll give you a nice container of roasted coffee beans. The thing is though, my wife hid it from me inside this box, and I can't figure out how to open the thing. Maybe you could help with that too. Have a look at the locked box inside before collecting the crops.*
[earn coffee from farming mini-game]

Rabbit (invisible POI near 4): *Sorry for scattering all the crops, I was just so hungry and had to eat something before the festival. Did you figure out how to open the coffee box yet? In return for eating some of the vegetables I left some clues on them for you to help open that box. If you're wondering how I managed all this, just relax! I'm a talking rabbit.*

Invisible Point*: NO-NAME MAN: Hold on a second! Sorry to bug you, but I think you might want to take a stroll down towards the south end of the village if you have some extra time. It could be helpful for the party, so you might want to tell all of your friends. It's not crucial, but it might be worth taking a visit, time permitting. Good luck, and I will see you at the party!*

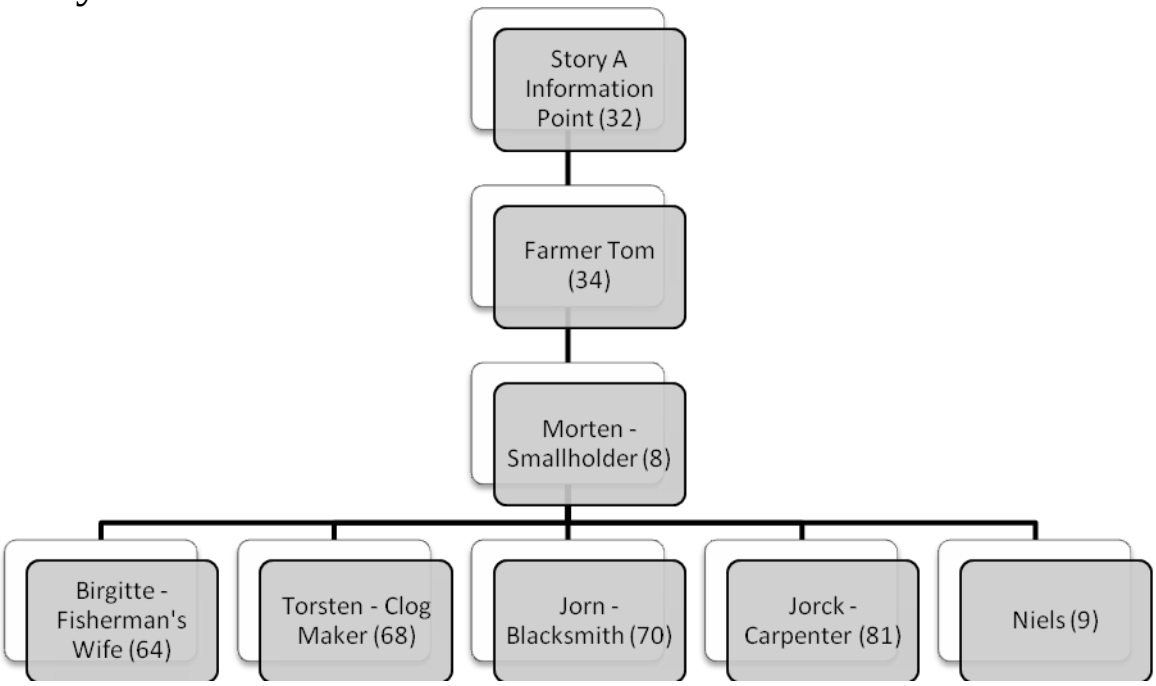
Invisible Bonus Point: *Congratulations! You have found the bonus location, so you receive 100KR. Please go inside and take your prize. If all the teams visit this location and take a prize, there will be an extra award given at the festival. You can use your money to purchase other items for the party at the Manor House.*

<u>The Manor House</u>

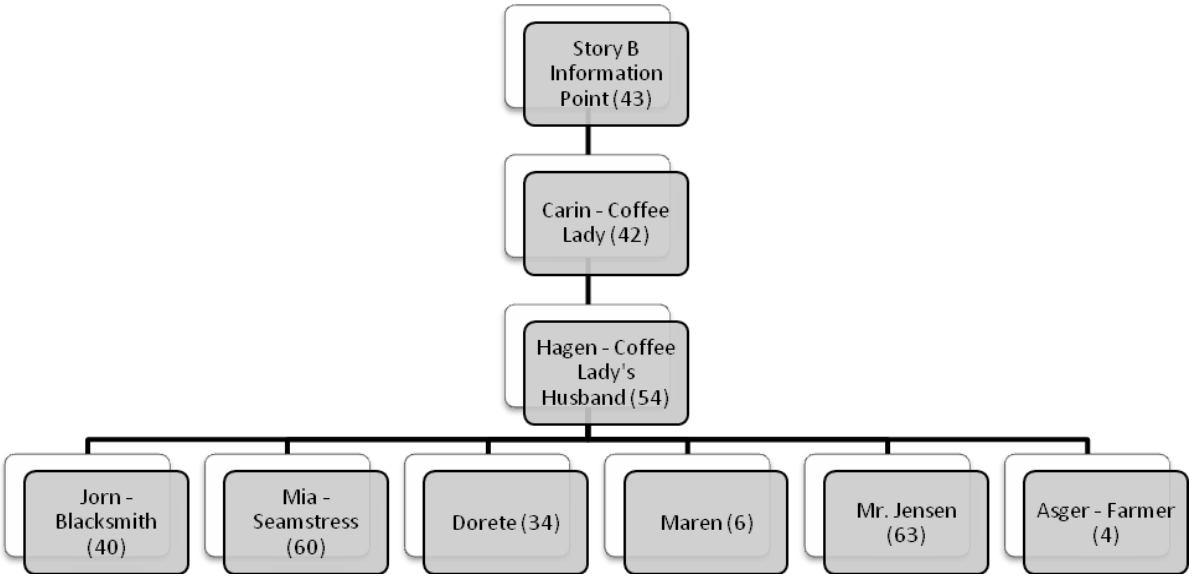
Instructor: *Congratulations, you have made it back to the Manor House on time. Now that you have collected all of the objects for the party, it is time for you to prepare the items before the guests arrive. But, first of all, all the groups need to reassemble into new groups. Only one person must stay in a group to instruct the others. Please follow me and I will show you the dining room... Once you have assembled the model butter churn, I will replace it with a real butter churn so you can begin churning your butter. Meanwhile, I will also need some people to grind the coffee beans and make some coffee. You have 30 minutes before the guests arrive. Please be seated at the table at ____ o'clock. Good luck!*

Appendix B: POI Layout

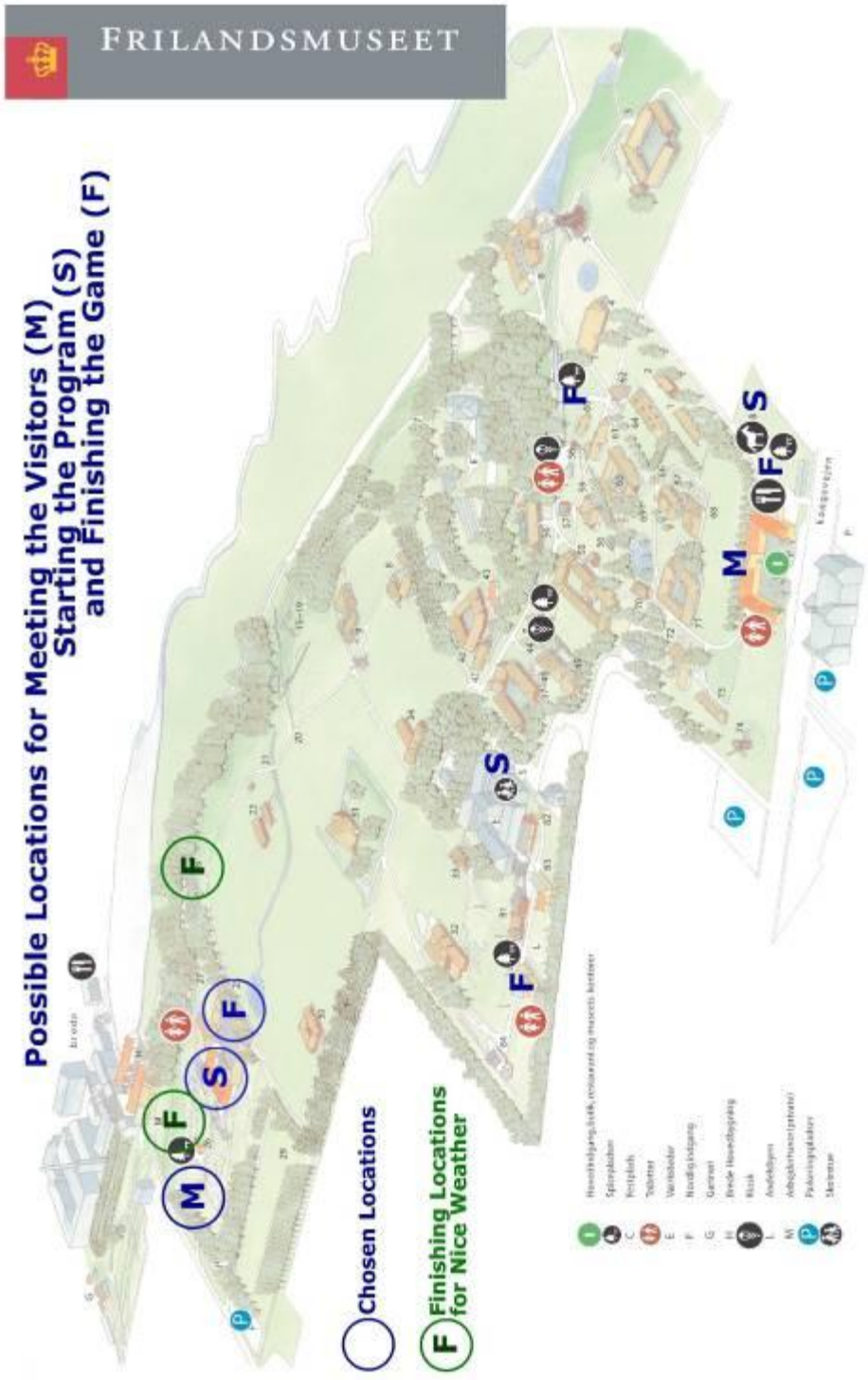
Story A



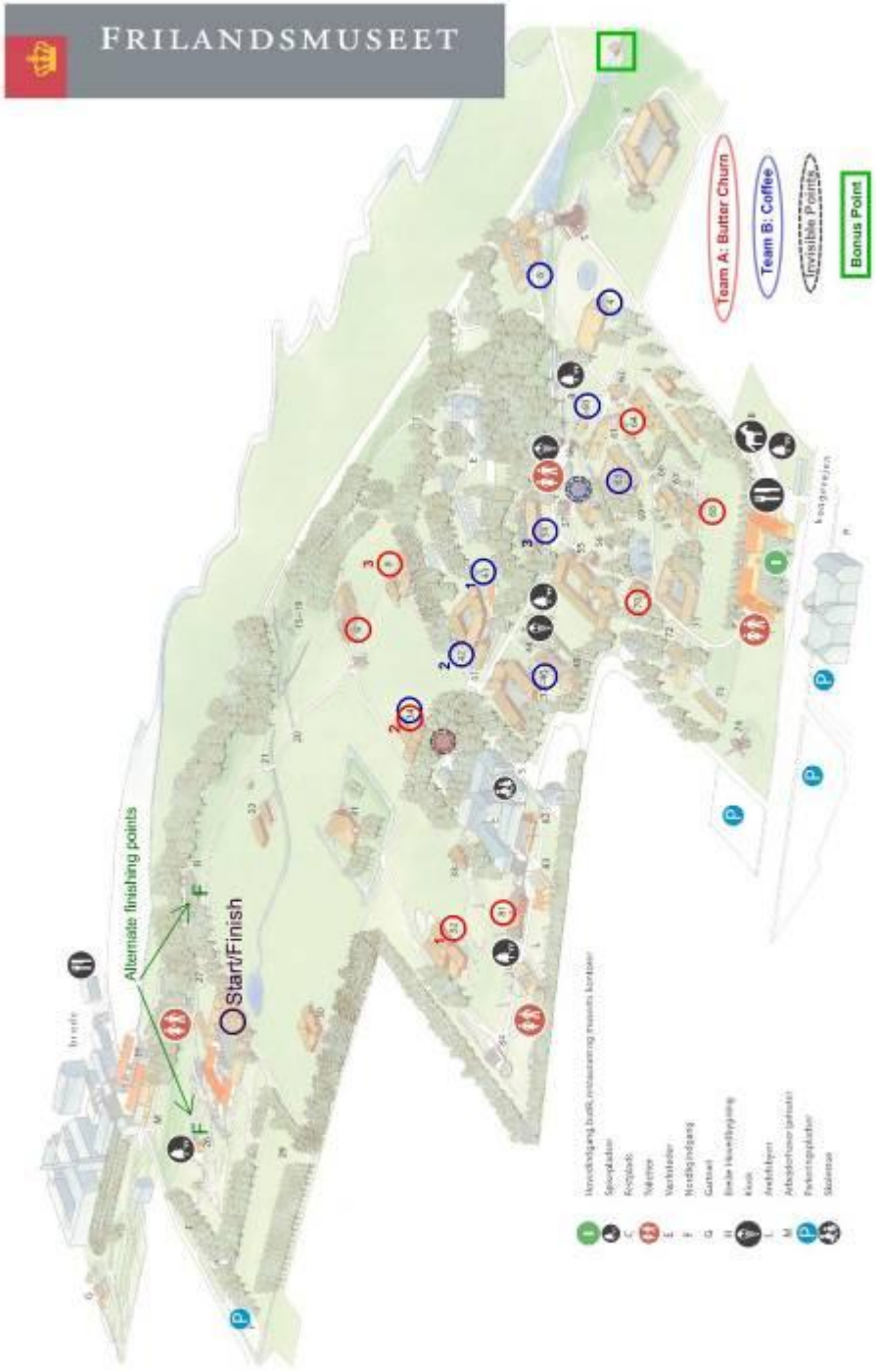
Story B



Appendix C: Map of Key Program Locations



Appendix D: Maps of POIs for Both Stories



Appendix E: Miniature Games

The purpose of the mini-games is to help groups develop the ability to effectively make decisions in small groups while incorporating an interesting feature into the LifePilot software. Participants will work together to solve the riddle presented by the mini-game, which will help them find an item that will be useful at the festival at the end of the program. These games are relatively simple, and can easily be programmed into the LifePilot software because they use virtual clues to help players find physical objects. If a group cannot solve a mini-game, an invisible POI can be activated that offers clues to solve the riddle.

The Butter Churning Group's Mini-game – Milking Cows
In this mini-game, Niels offers some milk for helping his wife milk his virtual cows. After activating Niels POI, action POIs appear around his house and the area surrounding it, which represent the cows in the mini-game. By visiting these points, players receive visual clues on the mobile phone that will indicate where the milk bucket is inside Niels' house. Each cow will have a letter associated with it, and by unscrambling these letters, the team can figure out what room the milk bucket is in. If a team does not figure out why there are letters on the cows, Niels' wife, an invisible POI, will explain how to solve the mini-game. Figure 6 shows an example of one of the cows in the mini-game.

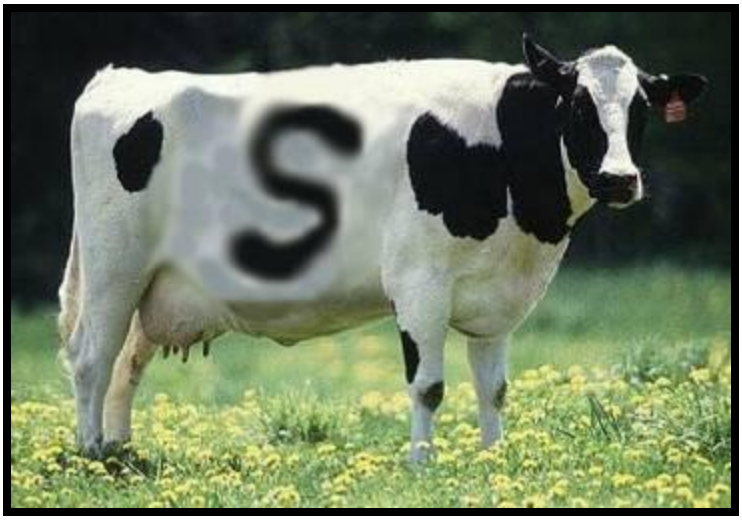


Figure 6: A Cow in the Butter Churning Mini-game

The Coffee Grinding Group's Mini-game – Finding Vegetables

The purpose of this mini-game is to find Asger's vegetables that have been scattered nearby. After visiting this POI, action POIs will be displayed on the mobile phone, representing the vegetables the team needs to find. Each vegetable has a bite taken out of it by the rabbit, which are clues to open Asger's locked coffee box. If the team cannot figure out the rules of the mini-game, a rabbit, which is activated by an invisible POI, explains how to open Asger's coffee box. Figure 7 shows an example of one of the virtual vegetables the team might find. The amount of bites left on the vegetable will correspond to the combination on a locked box, for example, one of the numbers above a digit to the combination will have a picture of a cucumber.

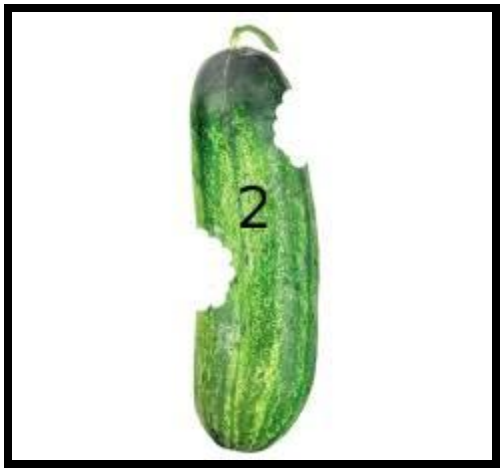


Figure 7: Vegetable in the Coffee Group's Mini-game

Appendix F: Land of Possibilities Survey Summary

What Worked Well:

The Form

- Like a computer game
- Engages the target group well

Technology

- Good technology

Moving Around the Area

- You see a lot of the area
- A fun way to move about the museum
- Lovely to be outside in the good weather – we liked the animals

The Role Playing Game and Virtual Persons

- Great that you have to think as your designated role
- Fun and interesting to meet the virtual persons – we were looking forward to meet new "people" and get the information and the history.
- Great voices, great pictures

The Merging of the Virtual and Physical Environment

- When physical environment and history meet, it becomes a good experience. The place acts as a backdrop, and history comes to life.
- Loved it when we were told where the virtual persons were standing, i.e. "next to the well." Then you get a merging of locality and artifacts with the history.

The Competition

- It was very engaging to win points
- It is logical why you win and lose points
- Good, that you can lose points – it heightens the drama

What Did Not Work So Well:

Technology

- It was sometimes slow. Waiting time for obtaining information
- Had to restart several times
- Primitive technology. Annoying to hold both phone and GPS (*should be remedied by the new GPS-integrated phones, ed*.)
- Very small screen

Merging of Physical and Virtual Environment

- Looked at the map and GPS a lot and not so much at the houses
- It would be nice to have a motivation for entering the houses

Navigation

- Too many unnecessary informations in the map
- Map on phone and paper don't match very well

Loss of Overview and Lack of Control

- It should be possible to choose whom to meet
- Difficult to figure out which person the blue dots represents
- Not enough information on who to find

- Some of the leads end blind
- Some of the POIs were to close, so you encountered the wrong person

Learning

- We didn't learn enough
- You should be able to use your knowledge even more

Interaction between Players

- We lacked social intercourse

How to Improve the Game:

The Form

- To play the game on different levels (more than one level)
- More shifts of pace

Technology

- Three dimensional glasses so you can see the persons talking
- Make the system work indoors
- Carry the technology at your body – a strap-on solution
- Make the GPS update faster

Artifacts

- It would be fun to collect and bring back some real objects
- Carry things around to new destinations, maybe by the help of sensors or some such

Merging of Virtual and Physical Environment

- It would be fun to meet real persons (actors or the like)
- To enter the houses and solve riddles that had to do with the game

Competition, Tests and Questions

- The possibility of solving questions or riddles underway
- More choices – more challenges
- The possibility of answering questions based on observations of the buildings and their environments
- The possibility of tasks or tests with a time limit/time count down

Navigation

- More directions – where are we to go?
- Zoom function on the map of the phone. More map levels (overview, location, building)

Overview and Feeling of Control

- Names on the blue dots (persons)

Learning

- Your personal knowledge of the times should be used more to win the game

Interaction between Players

- Persons/teams should get together to "talk"
- The possibility of exchanging artifacts or information with other players/groups

Appendix G: Finances

Operating Costs of Running Program Once

Activity	Time	Cost at 180 DKK/hr
Setup	1h	180
Welcome and Instruction	15-30 min	90
Game	1.5 h	270
After-game Function	1h	180
Cleanup	1h	180
Total		**900**

Item (estimated costs)	Approx. Cost (DKK)
Butter supplies	50
Coffee supplies	50
Bread supplies	50
Wool-spinning supplies	0
Other consumables	100
Total	**250**

LifePilot and Administrative	Approx. Cost (DKK)
Connection to LifePilot Server	1000
Booking, arrangements (1hour)	200
Telephone expenses	150
Total	**1350**

Total Running Costs	**2500**
Price (Income)	**10,000**
Revenue	**7500**

Approximate Development and Startup Costs

Developers	(writers, historians, voice actors, programmers)	100,000
New GPS-equipped Phones	2000 DKK x 10 Phones	20,000
Total Startup Costs		**120,000**

Appendix H: Interview Questions

Do you think this program would attract businesses and companies to the museum?

Did you feel like you were communicating enough with the other group?

What did you think about the story and plot?

Do you think the mini-games are necessary?

Do you have any suggestions on how to improve the layout or story?

How did you feel about walking around the museum? Was it too much, or not enough?

Did you spend enough time inside the buildings?

Did you see enough of the museum?

Comment on the Bonus Location concept.

Was there enough freedom in the game to make your own decisions?

Was there enough history or relevance to the museum?